DOCUMENT RESUME

ED 226 934 RC 013 920

TITLE	SCOPE (Standardized Curriculum-Oriented Pupil Evaluation) Mathematics. Teacher's Manual.
INSTITUTION	Northwest Territories Dept. of Education, Yellowknife. Programs and Evaluation Branch.
PUB DATE	[81]
NOTE	63p.; For related documents, see RC 013 921-927. Dr. I.R. Brooks is the developer of the test, originally known as the Achievement Test of Indian Children (ATC).
PUB TYPE	Guides - Classroom Use - Guides (For Teachers) (052)
EDRS PRICE	MF01/PC03 Plus Postage.
DESCRIPTORS	*Answer Keys; Canada Natives; *Criterion Referenced Tests; Elementary Education; *Elementary School Mathematics; Foreign Countries; Quantitative Tests; Rural Education; *Scoring; Teaching Guides; *Testing; *Test Use
IDENTIFIERS	Northwest Territories; *Standardized Curriculum Oriented Pupil Evaluation

ABSTRACT

The SCOPE test battery has been developed by the Department of Education so that Northwest Territories teachers can have a tool to measure classroom learning. SCOPE is based on a criterion-referenced approach to testing, meaning the tests are designed to determine each pupil's mastery of the skills embodied in the objectives of the Northwest Territories school curricula in the areas of English Language and of mathematics from kindergarten to grade 6. The SCOPE Mathematics Achievement Test is contained in seven test books, one for each of the grades K-1, 2, 4, 5, 6, with two books for grade 3. The manual provides the teacher with information necessary for administering, scoring, and interpreting the mathematics test covering objectives for grades kindergarten through 6, along with detailed instructions for giving and scoring each grade of the test. It is important to note that instructions may be translated into a native language or simple re-phrased depending on the needs of the children. Appendices list skills tested at each grade level and provide the answer key for each grade. (ERB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED226934

Scope

Standardized Curriculum - Oriented Pupil Evaluation

MATHEMATICS

[1981]

JAN 1983
RECEIVED
ERIC/CRESS

Teacher's Manual

RC013920

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Minister of Education
Govt. of the N.W.T.
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
✓ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Northwest Territories Education

FOREWORD

SCOPE Test is an integral part of core curriculum provided by the Department of Education and should be used as such. It is designed to measure the skills as they are set out in the curriculum. It is NOT designed to provide a measure of student's overall ability. It is simply a test to measure mastery of skills taught. Because of this, it is important that the test only be used within the context of the Northwest Territories Curriculum.

Within these constraints the test provides a valid measure of a student's progress. Teachers should use it as one means to determine the degree to which learning has taken place and to assist with the planning of program in the classroom.

A Word About the Teacher's Manual

This manual has been prepared to provide the teacher with the information needed to administer, score and interpret the SCOPE Mathematics Achievement Test. A careful study of this manual along with the test books is essential if efficient and effective use is to be made of the test.

In addition to the descriptive treatment of the test presented in the manual, it also contains material which will need to be consulted whenever the test is used. These include the list of skills tested and the Answer Keys. The manual therefore should become a practical handbook of SCOPE testing.

Background

The development of SCOPE has been one of the most extensive projects undertaken by the Department of Education. Almost by definition this has necessitated the involvement of a large number of individuals at various stages of its development. To express appreciation to them all by name, much as we would like to do so, would be an impossible task and we take this medium to thank them all. Certain individuals and organizations must however be singled out for their special contribution to this publication.

The project began in the Office of Educational Development, Native Students Services, at the University of Calgary. The test was first developed by Dr. I. R. Brooks as the Achievement Test of Indian Children (ATIC). Funding during the first three years came from the Donner Canadian Foundation. Since 1978, Dr. Brooks and his staff in Yellowknife have continued to develop the test under contract to the Department of Education.

It is recognized also that the present test battery, though perhaps bearing little outward resemblance to its earlier forms, owes much to its predecessors and those who cooperated in pilot-testing various forms. In this regard, a debt of thanks is owed to the Area Superintendent, the principal, staff and students of the Thomas Simpson School, Fort Simpson, for undertaking the first pilot work with this test.

During the course of development, pilot testing activities were carried out in the schools in Inuvik, Igloolik, Holman Island and Gjoa Haven and we wish to express our sincere thanks to the principals and staffs of these schools who in many instances were called upon to demonstrate their gifts of patience, flexibility and hospitality.

The most extensive field testing of SCOPE was conducted in the schools throughout the Keewatin Region. This required a considerable amount of planning, coordination and cooperation, and the Superintendent, principals and teachers in each school have our sincere thanks.

Last year SCOPE was used throughout the Northwest Territories. Thanks go to the students and teachers whose comments have been useful in designing this recent edition.

Table of Contents

Foreword

Background

Section 1. An Overview of the Test 1

2. Rationale for Criterion-Referenced Testing 2

3. Description of the Test and the Test Materials 4

4. Guidelines for giving the Test and Checklist for Administering Scope 8

5. Guidelines for Scoring the Test 14

6. How to Interpret and Use Test Scores 15

7. Some Technical Considerations 17

Appendix A. Skills Tested in SCOPE 20

Appendix B. Scoring Keys 28

An Overview of the Test

Testing Approach

The SCOPE test battery has been developed by the Department of Education so that N.W.T. teachers can have a tool to measure classroom learning. SCOPE is based on a criterion-referenced approach to testing (see pages to 4). This means that the tests are designed to determine each pupil's mastery of the skills embodied in the objectives of the Northwest Territories school curricula in the areas of English Language and Mathematics from Kindergarten to Grade Six. Test results should give teachers, parents and students a clearer picture of what each child has learned in these basic skills.

SCOPE Test Organization

The SCOPE battery consists of four tests - Mathematics: Achievement; Mathematics: Diagnostic; English Language: Speaking and Listening; English Language: Reading and Writing. Each test currently spans Kindergarten to Grade Six, although Mathematics: Achievement is being extended to Grade Nine. In all cases the tests are based on the objectives listed in the N.W.T. curricula. Each test is organized into the same grades or levels as the objectives in the curriculum for that subject. All of the test items for a particular grade or level are contained in a single test book.

•in preparation

Rationale

Teachers have been evaluating pupils for generations. Whether the evaluation has been by looking at what the child has produced, by listening to his answers to questions, by giving classroom tests or by administering school-wide standardized testing programs, the purpose has been the same — to see how well the pupil has learned what has been taught. Indeed, assessing student achievement is an important part of teaching. Without this knowledge there can be no individualized programs, no gearing of lessons to the pupil's current skill level and no sound promotional decisions. Since World War II, testing has become the common means for assessing student learning. Testing is efficient, systematic and productive. Although testing is by no means the only way of determining pupil progress, it has nevertheless become an integral part of the teaching — learning process.

Test scores by themselves are quite meaningless. They are just numbers. To become meaningful these numbers must have a reference — a basis of comparison. There are two approaches to providing this basis for comparison. The first is called norm referencing, and the second, criterion referencing. Simply put, in norm referencing the score of one pupil is compared to the scores from a larger group, known as the norming sample. Whether the score is considered to be "good" or "bad" depends upon the position of that score in the distribution of all the scores from the norming sample. For example, if pupil A gets 60 on a test and the class average is 40 (with the standard deviation of 10) he would be rated highly. On the other hand, if the average was 80 (with the standard deviation of 10) his performance of 60 would be considered to be poor.

The expression criterion-referenced exam was coined nearly twenty years ago. It was used to describe a type of exam that measured what a pupil could or could not do, not how he compared to his peers. Thus in a criterion-referenced exam, the pupil's score becomes meaningful by comparing that score to standards set *before the test is constructed.* A criterion referenced examination is an "objectives-based" measure which has cut-off scores used to make judgements about what the pupil can actually do. Individual differences between pupils are of little concern in criterion-referenced testing; it is the development of competencies or *mastery of skills* that is the critical question. An example of a criterion referenced examination is a driving test. To get a license the applicant must show mastery of a number of procedures such as left turns, parking, etc. How the applicant's performance compares to that of his peers is unimportant. He simply must show competence in handling a motor vehicle before receiving a licence.

For the past several years there has been a growing movement towards competency-based education. As the name suggests, this approach places the emphasis in schooling on the mastery of particular skills and knowledge thought to be important, especially for future skill development. The testing approach most often used in competency-based education is criterion referenced testing. The judgement to be made is simply whether the pupil has mastered the target skills and this decision is based on the pupil's mastery of a clear set of objectives listed in the curriculum.

During the past two decades, many educators have begun to turn away from norm-referencing and towards criterion-referenced tests. Although there are many reasons for this, one of the main reasons has stemmed from the teachers' needs. After testing, teachers need to know what the pupil can and cannot do so that instruction can be aimed at remedial work or at further skill development. True, many publishers of norm-referenced tests claim that results from their tests can be analyzed to yield this information. The point is, however, that norm-referenced tests are not designed to provide information about skills learned, whereas criterion-referenced tests are.

The SCOPE tests are criterion-referenced tests. This approach was chosen mainly because it does provide the classroom teacher with specific information about skill development. In order to meet the needs of his/her pupils, the teacher needs information about what each pupil actually knows not about how each compares to some "average pupil."

Another reason for choosing the criterion-referenced approach is that emphasis is placed on a series of scores not on just a total score. Total scores are based on a number of skills which although related are not identical. Hence, an important area of weakness could be obscured by good performance in other areas. For example, in a Mathematics Test comprised of 50% Concepts, 30% Measurement and 20% Computations, a pupil could get only one computations question correct and still appear to score highly. This would not happen in a criterion-referenced test because test results are interpreted according to skills mastered not by comparing total scores.

This highlights yet another advantage of criterion-referenced testing: namely, its close relationship to mastery learning and curricular objectives. Because test results are interpreted according to skills mastered, the emphasis on testing, reporting and subsequent teaching is on the mastery of those skills listed in the curriculum. The test itself clarifies the skills listed in the curriculum by providing examples related to both the content and the cognitive processes. Thus, teachers have a clear idea of what the pupil should be able to do when he has mastered the skill. Reporting to the child, his parents and his next year's teacher is thus on the basis of what the pupil has actually learned to do.

Another important reason for choosing a criterion-referenced approach has to do with the question of a standardization sample. The Northwest Territories is a very large area containing a small population divided into many distinct groups and sub-groups. The differences among these groups are so marked that it would not be practicable to develop reliable and valid norms for N.W.T. schools. Yet another reason for moving to criterion-referenced tests has to do with the technical competence needed to interpret the scores from norm-referenced tests properly. To interpret "raw" scores properly one must know the standard deviation of the group of scores and, preferably, the standard error of measurement for the test. For convenience, most published tests convert raw scores to standard scores. Percentiles, grade equivalents, IQs, T scores and Z scores are examples of these. Thus, to use the test properly, the teacher must understand what each type of standard score means (and doesn't mean). Most importantly, however, whether or not a norm-referenced test is useable depends on whether the standardization sample is representative or typical of your pupils. Needless to say, this presents a real problem in the Northwest Territories. For these reasons, experience has shown that the skill checklists from criterion-referenced tests are faster and easier to interpret than standard scores. And conclusions made are likely to be more reliable and valid.

Criterion-referenced tests thus provide teachers with specific information about skill development. Emphasis is placed on what the pupil can actually do, not on how he compares to some average. Emphasis is also placed on a series of scores not just on a total score. As a result, areas of weakness are not as likely to be obscured. Moreover, criterion-referenced tests are closely related to mastery learning and curricular objectives. Test items themselves help clarify the objectives set for the teachers. Finally, in a region as culturally diverse as the N.W.T., it would be difficult to find a representative norming sample. Hence, results from a norm-referenced test could not be interpreted with a high degree of reliability and validity. For these reasons, a criterion-referenced approach to classroom testing has been adopted for N.W.T. schools. It is believed that this approach will be of the greatest benefit to both teachers and pupils and most closely parallels the approach to learning reflected in the curriculum.

Description of the Test And The Test Materials

The SCOPE Mathematics Achievement Test is truly a northern test. It is based on the NWT Math curriculum with the skills listed in the curriculum being the criteria for the test. This is an important point as other published standardized tests used in Canada are based on a general "Canadian" or, indeed, "North American" curriculum. Of similar importance is the fact that the format, the instructions and the test questions themselves were developed with northern children in mind. During its development, SCOPE was pilot tested in a number of our schools from Holman Island to Hay River and from Inuvik to Igloolik. Prior to the publishing of this final version, SCOPE Math was used in every NWT school during the 1980-81 school year. Feedback from teachers, principals and superintendents has helped to improve aspects of the test that cause confusion or problems.

SCOPE Math is a standardized test in the sense that the same skills are tested at the same grade level with the same questions. Being criterion-referenced, SCOPE has more flexibility than a norm-referenced test, however, and this is most important in the north.

Test Materials

This manual provides the teacher with the information necessary for administering, scoring and interpreting the Mathematics test covering the objectives for Grades Kindergarten through Six. Further along in the manual you will find detailed instructions for giving and scoring each grade of the test. In the Appendices to this manual can be found the list of skills tested at each grade (Appendix A) and also the Answer Key for each grade (Appendix B).

The SCOPE Mathematics test is contained in seven test books, one for each of the Grades K-1,2,4,5,6. There are two books for Grade 3, numbered 3 and 3S. Books K through 3 are consumable. That is, students write their answers directly in the test book, so the book can be used only once. Test books 3S, 4, 5 and 6 are reusable. Pupils are given answer books, separate from the test books, in which to record their answers. In addition, these two sets of books differ with respect to the amount of teacher direction required in taking the test and also in the number of test questions given on each page. For the lower grades, K1- 3, the directions for completing each set of items are given by the teacher and only two questions are given on each page. Beginning with Book 3S, however, the directions have been written to permit the student to take the test with little or no teacher direction. At this level there are four test items per page.

Grade 3 objectives can be tested using either Book 3 or Book 3S. While the content is the same in both, Book 3S may be found more suitable for more mature students who need to be tested on Grade 3 material, particularly those who are about to, or are already engaged in, covering the Grade 4 curriculum. It is important to determine, however, whether the student's reading ability is adequate for testing in this manner.

Objectives Tested

As indicated above, the objectives assessed in each SCOPE book are those specified at the corresponding grade within the mathematics curriculum. However, not all the objectives listed are tested. Selection of the objectives to be tested was based on several criteria. First, because this test is designed to permit group testing, those objectives which did not lend themselves to this approach had to be excluded from the Achievement Battery, but are included in the Diagnostic Tests. Also, where an objective, or the skill which it implies,

was tested at one grade, it was not included at higher levels even though it may have been specified in the curriculum guide at more than one level. In addition, two or more objectives have sometimes been tested in combination where these were felt to be too narrow to warrant separate test items for each. Conversely, multi-faceted objectives have been separated to provide for the assessment of each of the embedded skills.

The following Table shows the number of skills tested at each grade and the proportion of the total number of skills at that grade that this represents. A detailed list of the skills tested at each grade can be found in Appendix A. For convenience in relating the test to the curriculum, the number and statement used in the test to refer to each skill is identical to those used in the curriculum.

Table
Summary of Test Book Contents

Book	No. of Objectives Tested	Proportion of* Total No. of Objectives at this grade
K-1	15	41%
2	22	58%
3, 3S	27	63%
4	26	63%
5	32	87%
6	22	69%

*Excludes maintenance objectives.

Number Of Test Items

With few exceptions, each skill is tested by means of seven questions. In those cases where fewer than seven questions were asked it was felt that the requirements of the objectives were fully met and that no more questions were required.

Although in most instances many more than seven test items could have been employed for testing a particular skill, a decision had to be made as to how many questions were needed to provide adequate reliability and yet not create a test which was too long for practical classroom use. The seven items were selected on this basis. (The issue of test reliability is discussed in a subsequent section of this manual.)

Test Format

Books K-1, 2 and 3 are designed for younger pupils or for those with little school experience. Accordingly, the directions for each set of items are more elaborate and there are only two items per page. Although it may appear that the spacing of questions is excessive, studies have shown that children with little experience with pencil and paper tests do poorly if items are too closely spaced. This is because of the distraction caused by the other items surrounding the "target" item. Books 3.S, 4,5 and 6 contain four items per page as older pupils are not usually so easily distracted.

At the top of the first page for each new set of questions in all books can be found the skill number, a statement of the skill and another number or a picture. Both the skill number and the description of the skill are identical to those used in the curriculum. This is to facilitate referring back to the curriculum. Occasionally a skill in the curriculum will have more than one component (e.g. Adds and subtracts whole numbers). As SCOPE usually tests only one component at a time, that part *not tested* will be in parentheses in the test book.

The number or picture found at the top right hand corner of the first page for each new set of questions is for use in directing pupils to a particular page. As many younger pupils cannot recognize decimal or double-digit numbers, it has been found useful to include this additional identifier.

In books K-1, 2 and 3, each set of items testing a skill begins with a demonstration item. The purpose of this item is to convey to the pupil what it is he is supposed to do to show that he has mastered the skill. In fact, pupils should have little difficulty as the items are presented in ways used by most classroom teachers and by most text series. In the Teacher's Edition of each book (found in this kit) are the instructions for introducing each set of questions and each demonstration item. These instructions are to be used as a guide. They *do not* have to be given word for word. Instructions may be translated into a native language or simply re-phrased depending on the needs of the children. It is most important that the demonstration item and the instructions are understood.

Following the demonstration item are the test questions. Usually there are seven of these. This number was chosen to provide a reliable sample of the pupil's knowledge and yet keep the test to a workable length. More questions would yield more reliable conclusions but yet take more classroom time. Fewer questions would take less time but yield lower reliability. Seven was judged to be a reliable and workable number. In a small number of cases there are fewer than seven questions. This is because no more questions could be developed for that skill without repeating some items. For example, in testing ordinals to fifth, there can be only five questions before repetition occurs.

It will be noted that there is a progression to the degree that pupils must rely on the teacher's directions. Younger pupils must depend on the teacher's oral directions for nearly every question, whereas older pupils can work independently. In the K-1 book, the teacher gives the instructions for the demonstration item and then shows the pupils what is to be done. Pupils then make the same response in their own books. Separate instructions are given by the teacher for each item and the class moves through the test together, question by question.

This approach is essentially the same for Book 2; however, there are some questions on which the pupils can work independently. In these cases, pupils are taken through the practice item and then left to work on the seven questions for that skill at their own speed. In Book 3 (with 3 exceptions), the teacher gives the instructions and then provides the answer to the demonstration item orally. The teacher then checks to make sure that all have understood the demonstration and then gives the instructions for the following seven questions. Pupils work at their own speed until they reach the stop sign at the end of the skill.

Books 3.S, 4, 5 and 6 are designed for independent work. The instructions and the demonstration items should be self-explanatory. For some pupils, where English is a second language for example, it may be necessary to supplement the instructions. Whether the teacher introduces each set of questions before allowing the pupils to work or simply tells the pupils on which pages to work depends upon the test sophistication and English language ability of the pupils. Only the teacher can be the judge of that. Pupils working at these grade levels do not mark their answers in the test book. Rather, they have their own Pupil Answer Books. Again, some pupils will need instruction in using a separate answer book and will need to be monitored closely.

Pupil Record Form

Scoring is done by means of Pupil Record Forms containing a statement about the skill, its number, the numbers of the questions tapping the skill and a place in which to indicate mastery. Not all of the skills listed in the curriculum can be tested by SCOPE. Never-

theless, it is just as important that pupil mastery of these skills be monitored too. To facilitate this, the Pupil Record Form also lists the skills not tested by SCOPE and makes provision for teachers to record how mastery was assessed and when the skill was mastered.

Class Record Form

A Class Record Form is provided so that the test results for the entire class can be summarized. This enables teachers to tell at a glance which pupils need further help and also which skills have not been mastered by groups of pupils.

To aid in scoring the test, a scoring key is provided in Appendix B of this manual. There may be occasions where the terminology or form of expression used in the classroom differs from the key. Providing the two answers are essentially the same, it is permissible to deviate from the keyed response.

More detailed information on administering and scoring the test and interpreting the test results is given in the next section of this manual.

Guidelines For Giving The Test

1. When to test

The first step in giving SCOPE is to decide on the time of year for testing. Testing in the autumn allows the new class teacher to identify which skills the pupils bring with them and, therefore, helps in determining where to begin instruction. Testing at the end of the year, on the other hand, allows the teacher to see how much of what has been taught has been learned. This helps in making promotional decisions and in reporting to parents. It is also possible to test in the middle of the year to see what progress is being made and to identify those pupils needing remedial or enrichment work.

Testing can be done more than once but the test should not be used as a "unit test." SCOPE is designed as a test of the "long-term" mastery of skills and to use it immediately after each skill had been taught and practiced would reduce its effectiveness as a long-term measure. Teachers wishing to develop unit tests could use SCOPE as a model. It is important that the actual question not be copied, however.

When to test is an important decision and time of testing should be consistent throughout the school. Consequently, it is recommended that the decision be made by the entire school staff, the school administration or the regional office. It should not be left to individual teachers.

2. Choosing the skills

The second step in using SCOPE is to choose the skills that will be tested. As mentioned earlier, the skills tested in this edition of SCOPE match the skills listed in the NWT Mathematics Curriculum (1981 revision), although not all skills in the curriculum are tested. Accordingly, the skills in SCOPE are organized into books which correspond to the grade levels used in the curriculum. This is only an administrative convenience, however. It is fully realized, indeed expected, that pupils will be tested with skills taken from more than one grade. The grades (or books) then should be used only as a guide in selecting the skills. Of greater use will be the list of skills found in Appendix A of this manual. Teachers testing at the end of the school year should review this list to find the skills that they taught during the year. Teachers testing at the beginning of the year will have to review the list and select those skills they know or assume were taught during the preceding year.

The list of skills contains the skill number and skill description as laid out in the curriculum. It also contains the numbers of the questions that tap that skill. Hence, it is a relatively simple matter to review the list of skills, identify the skills relevant for testing and record the Book and the question numbers needed.

3. Scheduling testing sessions

Once you have recorded the skills and the questions needed for testing, it will be possible to calculate both the total time necessary for testing and the number of sessions required. On the whole, it takes 7-10 minutes to introduce and test each skill for younger pupils (K-3) and 5-7 minutes per skill for older pupils (4-6). These of course are only approximate times but will be accurate enough for planning purposes. After you have determined the total number of minutes needed to test, break it down into several test sessions. Your knowledge of the attention span of your students should provide you with a guide as to how long a testing session should be. This would be in part a function of the age of the

students, with younger students having a shorter attention span than the older ones. Maximum testing time for pupils in Kindergarten and Grade One is about 30 minutes. Pupils in Grades 2 and 3 can work for 45 minutes and those in 4, 5 and six from 60 to 90 minutes. Again, these times are only estimates. Err on the side of caution; that is to say, it is better to have more short sessions than sessions that are too long. Finally, schedule the testing in your plan book. Plan your testing so that the breaks come at logical or natural places. Early mornings and late afternoons are probably best avoided, as is right after lunch if your pupils are slow to return to school.

If the pupils in your class represent a wide range of skill development, it may be advisable to divide the class into groups for the testing. This means that for younger pupils working in Books K-1, 2 or 3, you will have a group being tested and a group (or groups) that need to be kept busy. This can be done by bringing a parent, classroom assistant, substitute teacher or member of the school administration in to look after the pupils not being tested. Perhaps it is possible to make arrangements with another teacher for her to take some of your class for 30 minutes. If your pupils are accustomed to "seatwork", they may work well on their own on another project. Whichever way you solve the problem of supervising the non-test group, you will find it easier to group the pupils than to give items to pupils who cannot work at that level.

4. Preparing yourself

Prepare yourself for testing. The more organized you are and the more familiar you are with the test materials and test questions, the more smoothly the test will be presented to the pupils. A poor presentation will confuse pupils and lead to poor performance. This would cause you to underestimate their skill development. Take the time to prepare properly.

5. Prepare the pupils

Two or three days before you begin to test, take a few minutes to explain to your class what will be happening. Explain that they will be doing a test (or work or exercises) that involve things they have already learned. Stress that they have seen this work before and that they will probably enjoy doing it again. You might like to hand out the pupils' books, let them write their names on the front and take a quick look through. Tell them that they won't be doing all of the exercises at once but will spend a little time working each day. Try to convey that the test is something to take seriously but not worry about. It is something at which they should work hard when it is in front of them but not think about when it's not. Mostly it is something they should enjoy because they have already learned how to do the work.

6. Arrange the classroom

Many young pupils, and nearly all pupils who have had little formal experience with tests, find it hard to understand that they must work on their own without looking at what their friends are doing. A lot of this "cooperative work," copying or general fooling around can be avoided by arranging the chairs so that pupils do not have unobstructed views of each other. If it is necessary for more than one pupil to sit at a table, place a divider (a tall book, piece of cardboard) between them. Arrange the tables so that pupils face away from each other or face each other's backs. Isolate distractible and distracting pupils. The time taken to prevent opportunities for communication will make testing much easier. Also remove from the classroom any distractions such as models, pets, etc. Make sure that you have a blackboard or flipchart placed so that it can be seen by everyone. This will be necessary for giving the demonstration items.

7. Beginning the test

It is important to settle the class before attempting to begin with the first series of questions. This is done by making sure that they have all been to the washroom or have had a drink of water, all have their pencils, rulers and erasers, and are all sitting in their correct seats. Before handing out the test materials, briefly review the introduction given a few days earlier (see point 5). Again say things that stress that they should take the test seriously, work hard and work independently. Reinforce that they have seen these exercises before and will probably enjoy doing things they already know how to do. After these few words, hand out the test materials telling pupils to keep their books closed.

8. Going through the test

Instruct the pupils to turn to the first series of questions you have chosen. In books K-1 and 2, pictures have been used to identify series of questions.

Once you are sure that all pupils are at the right page, give the instructions. Books 3.S, 4,5 and 6 are self-administered and so pupils can read the instructions and look at the demonstration item themselves. For other levels, the teacher will give the instructions verbally. *In either case, it is not necessary to limit the instructions to those given in the test books.* Instructions may be translated into a native language or re-phrased to make them understandable. It is most important that pupils understand the instructions and you have a wide degree of latitude in presenting them, providing you do not actually teach the skill being tested. As part of giving the instructions you will present the demonstration item. In the K-1 and 2 books, the teacher writes the answer to the demonstration item in the book as well as giving the answer orally. Pupils then copy the answer in their own books. Teachers may wish to copy the demonstration item onto the blackboard so that it's easier for the class to see the answer. This is a good practice. In Book 3, the teacher gives the answer orally and pupils write it into their books. In books 3.S to 6, the answer is printed in the test books in handwritten style. Hence, pupils simply read the instructions and look at the demonstration item and answer. At these levels it is expected that pupils will be able to understand what they are required to do by seeing an example. If this is not the case, however, *it is permissible to give further instructions orally.*

After the pupils have understood what they are required to do, start them on the seven test questions for that skill. In Books K-1 and 2, pupils are reliant on the teacher's oral directions. Hence, with the exception of one or two skills in Book 2, it is best to take pupils question by question through the test. You will find any directions you are required to give printed in the Teacher's Test Book. In Book 3, pupils can work at their own speed *within each skill* because where there are directions before each item, they are easy to read. After you have given the instructions and worked through the demonstration item, tell them to work on the questions until they reach the stop sign. If you find that your pupils cannot work independently, go through the test with them question by question.

As you are testing you will observe that not all pupils work at the same rate. Indeed, you will notice some pupils who are much slower than the others. If you delay the whole group to allow one or two to finish, you will find that the more capable pupils become bored or frustrated. Hence, they will lose interest in the testing. You are therefore better to keep the group moving at the pace of the majority and go back and test slower pupils at a later date. You might also find a few pupils who can work much more quickly than the others. If they become bored waiting for the others let them go ahead to other skills. Keep an eye on them, however, to make sure that they understand what is required of them.

During the testing it is important to monitor the pupils' work. Walk around the class observing them. Are they working on the right page? Have they understood what they are required to do? Are they working hard? Offer encouragement and assistance where appropriate. Give personal attention and make positive comments. Testing can be a positive and rewarding experience for children. Remember that the only obstacle to getting the right answer should be the pupil's failure to have learned the skill being tested.

If during the testing session you notice that the pupils are getting tired and their attention is beginning to wander, stop at an appropriate point and take a break. Let everyone stand up, stretch, walk around and generally relax for 5 minutes. This will not interfere with the testing. Quite the opposite, it will facilitate good pupil performance.

9. Concluding the testing

At the end of the testing session, remember to collect all of the test materials. For books 3.S to 6, this means the pupil answer books and the test books. Take a few minutes to discuss the test with the class. How did they like it? Was it hard? How did they do? etc. Conclude by making positive comments about their work. Mention things such as how well they worked, how quiet they were, how they seemed to do well and so forth. To end the testing on a positive note will give them a good start for the next session.

Checklist For Administering SCOPE

1. Choose the skills.

- Review the list of skills.
- Identify the skills to test.
- Make a list of the skills, books and questions you will use.

2. Schedule the testing.

- Calculate the time needed to test.
- Calculate the number of testing sessions needed.
- Schedule these in your plan book.
- If necessary, divide the pupils into groups.
- Arrange for the supervision of the non-test groups.

3. Prepare yourself.

- Collect a sufficient number of test books at the grade levels required. Remember, pupils working in Books 3.S, 4, 5 and 6 require pupil answer books.
- Mark the pages in the Teachers Book that you plan to use.
- Review and practice the instruction and the demonstration items.

4. Prepare the Pupils.

- Tell them that testing will take place soon.
- Explain what the test is all about.
- Stress that they have done this work before.
- Let them see and look through the test books.

5. Arrange the classroom.

- Re-arrange the seating.
- Place "dividers" between pupils working at the same desk.
- Isolate distractible and distracting pupils.
- Remove distractions such as classroom pets, models, etc.
- Place a flipchart or blackboard where it can be seen by all.

6. Beginning the test.

- Make sure pupils have been to the washroom, have their pencils and erasers and are sitting in their correct seats.
- Briefly repeat the introduction to the test given earlier (see point 4).
- Hand out the test materials and tell pupils to keep their books closed.

7. Going through the test.

- Turn to the first series of items.
- Give the instructions in language understandable to the pupils.
- Work through the demonstration item.
  - — K-1, 2 Teacher writes answer and pupils copy
  - — 3 Teacher gives answer orally and pupils write
  - — 3.S to 6 pupils see answer written in test book.

- Instruct pupils to work on the test questions.
  — K-1, 2: pupils work question by question
  — 3: pupils work skill by skill
  — 3.S to 6: pupils can be directed to several skills and left to work at their own speed.
- Circulate among the pupils making sure that they are on the right page, appear to have understood the instructions etc.
- Take 5 minute breaks if necessary.

8. Concluding the testing.

- Collect all materials.
- Discuss the testing.
- Make positive comments.

Guidelines For Scoring

Scoring the pupil test books is a relatively simple procedure but, unfortunately, no less time consuming than for most classroom tests. However, a conscientious effort in scoring is a prerequisite for obtaining accurate information on student achievement.

Materials Required

The following items are required for scoring the test:

a. Student Test Book (K-3) or Answer Book (3S-6)
b. Appropriate Scoring Key found in Appendix B of this manual.
c. The Pupil Record Form appropriate for the test book(s) used.

Procedure

1. The Scoring Keys provide the correct answers to the questions contained in each test book. By comparing the student's answer, written either in the test book or in the pupil answer book, to that given in the scoring key, each item can be marked right or wrong.

   Some occasions may arise in which the teacher may judge an answer to be acceptable even though it is at variance with the scoring key. In such cases the teacher should use his/her judgement in giving the student credit for the answer.

2. The Pupil Record Form lists in abbreviated form the objectives tested in each year along with the numbers of the questions used to measure mastery of that objective. Place a check mark beside the objective tested. Using the marked test book or Scoring Key, place a check mark on the corresponding question number on the Pupil Record form for each question answered correctly.

3. When all the test questions relating to a given skill or objective have been marked the number of questions answered correctly (the number of check marks) is summed and determination of mastery is made for that objective.

   Where there are 7 test questions mastery is achieved when 5 or more are answered correctly (5/7). For fewer than seven items the criteria are 5 or more of 6(5/6) and 4 or more of 5 (4/5).

4. Put a check mark in the first "Mastery" box on the Pupil Record Form to indicate that the objective has been mastered and an "X" to signify non-mastery.

   Following these procedures all the information needed for evaluating the students performance will be contained on the Pupil Record Sheet.

How To Interpret and Use Scores

Interpreting Scores on Criterion-Referenced Tests

Criterion-referenced tests are generally contrasted with norm-referenced tests as one of the major differences between them is the manner in which scores are interpreted. Norm-referenced test scores derive their meaning from comparisons with scores obtained by other individuals who have taken the same test. Examples of these types of scores are grade-equivalents, stanines and T-scores.

Scores on criterion-referenced tests, on the other hand, are interpretable without reference to the performance of other individuals. Such scores have meaning directly in terms of pre-determined criteria of performance. In SCOPE, the criteria are the skills listed in the Mathematics Curriculum. Test scores, therefore, are interpreted according to whether these skills have been mastered, with mastery being indicated by correct answers to at least 5 of the 7 questions. As the skills actually tested were chosen by the classroom teacher, the pupil's list of skills mastered or non-mastered should be meaningful information.

Procedure for Interpreting Scores

After you have scored the tests you will have completed a Pupil Record Form for each child tested. This sheet is in itself useful for identifying the strengths and weaknesses of each pupil, thus identifying skills that need remedial work or re-teaching, or skills that can be extended. A more detailed look at the number of questions answered incorrectly will reveal those skills where mastery is "borderline." Pupils may well benefit from increased practice in those skills where only 5 of the 7 questions were answered correctly.

From the Pupil Record Form you can, as mentioned, identify those skills in which deficiencies exist. If you turn to the actual questions in the pupil test book and look at the pupil's work, you will be able to see the types of errors the pupil made. This information will help you to understand where the misunderstanding(s) lie. Information about the pupils' errors spotlights "the problem" and thus guides remedial teaching. Several pupils may have made the same errors and therefore can be re-taught in the same way. Others may have failed to understand at another level and may require a different approach to re-teaching. Error analysis aids in individualizing instruction.

The Pupil Record Form provides a detailed record of what the pupil can and cannot do. It should therefore be passed on to future teachers so that they can begin instruction at an appropriate level. It is recommended that the Pupil Record Form be placed in the child's Cumulative Folder. Moreover, because this information is so detailed it provides an excellent basis for reporting to parents about their child's progress to date. If testing is at the beginning of the year, the results provide a starting point from which learning can be measured.

Information from the Pupil Record Form can be transferred to the Class Record Form to provide an overall picture of skill development within the class. This clerical task will take a few minutes but will save time later by providing an easy to use summary and record. A glance down the columns will reveal skills that are weak for a significant proportion of the class or the class as a whole. Similarly, you will be able to see pupils that seem to be working at a more advanced level than the rest of the class. This information is useful in forming instructional groups or in identifying groups for remedial or enrichment ac-

tivities. A glance down the columns will reveal common areas of weakness and this information, in turn, may tell you something about the abilities of your pupils, your own teaching methods or the curriculum itself. In any event, the class record sheet will help you to plan your teaching program and gear new instruction, review exercises or remedial activities to the appropriate groups of pupils.

In summary, the primary application of testing with SCOPE is in the area of classroom instruction. Because the test provides information regarding the skills which have been mastered and those which have not, it is possible for the teacher to concentrate on those areas in which deficiencies are apparent both on an individual and a group basis. Test results are therefore used to prescribe instructional programs. Furthermore, the grouping of students for instruction on the basis of similarities in their patterns of strengths and weakness on the skills tested is also made possible by these test results. Finally, the test results can be used as the basis of a reporting system for providing information to parents and students about each student's progress, in a way which might be more meaningful than other approaches.

Some Cautions

It should be remembered that the skills tested in the SCOPE Mathematics Test are a sub-set of those given in the curriculum guide. The rationale for the selection of these objectives has been presented previously. In view of this it is important not to overlook those objectives which have not been tested in SCOPE. It is expected that instruction based on these objectives will be undertaken and attempts made to determine whether or not the skills have been mastered. The Pupil Record Form lists these skills and makes provision for the teacher to record how and when mastery was assessed.

Because of the manner in which the test is structured, there may be the temptation to refer to the performance of a student as being at some "grade level" as if this was an absolute standard. The concept of grade level is actually a relative one and grade level in any jurisdiction can be determined only by the curriculum used in that jurisdiction. The sequencing and grouping of the skills tested in SCOPE merely follow the N.W.T. curriculum guide for mathematics. It must be remembered that the purpose of the test is not to classify pupils according to grade but to identify the skills they have mastered and not yet mastered.

The information obtained from the administration of SCOPE does not represent all the information that the teacher may or should have about a student's degree of mastery of the basic mathematics skills. SCOPE test-scores must be viewed in the light of these other sources of information, such as classroom work, informal observations, and classroom tests. Where a discrepancy appears to exist between SCOPE test scores and the teacher's impressions of the student's "true state of mastery" of the material taught, this is a signal for the need to examine more closely the possible sources of the discrepancy. Interviewing the student, re-testing the skills and re-examination of classroom work are possible approaches which can be taken. The important thing to remember is that a test, no matter how well prepared, is never infallible and is subject to error particularly in individual cases. It should be used as a tool to assist teacher judgement but never to supplant it.

Some Technical Considerations

Validity — General Considerations

The validity "question" is usually posed in the following manner: "To what extent does the test measure what it is designed to measure?" The validity of a test can be assessed in a variety of ways depending upon the type of test it is and how it is used. Indeed it is not appropriate to consider test validity outside of the context of the purpose for which it is used. For example, achievement or ability tests which are used to predict future performance or learning, must exhibit satisfactory predictive validity. Similarly tests purporting to measure underlying traits must be judged valid for this purpose on the basis of the degree to which they can demonstrate that they do in fact measure such traits and not something else (a very difficult task indeed). Clearly, a single test may be used for a number of different purposes in which case questions of validity must be raised for all these uses.

Content Validity

Criterion-referenced tests such as SCOPE are generally used to determine whether or not students have achieved mastery of a skill, acquired some unit of knowledge or reached some specified level of task performance. Validity in these cases then resides in determining whether or not the test provides adequately for such performance to be demonstrated.

This type of validity, known as Content Validity, is the relevant type of validity in the measurement of academic achievement. Basically, one asks to what extent the test requires the pupil to do what the curriculum says he ought to be able to do, following instruction. For a test to have high content validity it must reflect both the topics and the intellectual processes prescribed in the curriculum.

Content validity is determined by logical analysis not by statistical methods. Judgements must be based on the following criteria:

1. Does the test parallel the curriculum objectives in content and processes?

2. Does the emphasis in the test reflect the emphasis in the curriculum?

3. Is the test free from extraneous factors that can interfere with the pupil's test performance (such as reading level)?

The content validity of SCOPE has been determined according to these criteria and the judgements of those individuals who are considered to be competent to make these judgements, such as teachers, curriculum experts and educational psychologists, among others. The test was developed to measure those skills which are contained in the mathematics curriculum of the Northwest Territories elementary schools. The test items selected to accomplish this were subjected to review by those categories of individuals indicated above. Further, as the tests were used in the classroom setting changes were made to improve content validity. The Math curriculum in the N.W.T. is a "core curriculum" emphasizing basic skills and concepts. The test reflects this emphasis. Further, as discussed previously, SCOPE is a northern test designed for NWT pupils. Hence the strengths and weaknesses of northern pupils have been taken into account in item development, thereby reducing many of the extraneous factors that limit test performance. Finally, as changes have been made to the Mathematics curriculum corresponding revisions have been made to SCOPE so that its content validity is maintained.

Criterion-Related Validity

Content validity is certainly most important for achievement tests; however, it is not the only type of validity that must be established. The two types of criterion related validity, concurrent validity and predictive validity are also of concern. Concurrent validity refers to whether the test correlates well with other existing tests that tap the same subject matter. After all, there should be some relationship between two tests of mathematics skill development even if one test is better than the other. Predictive validity refers to whether test scores can, in the case of an achievement test, identify pupils ready for new concepts or who will benefit from remedial/enrichment lessons. In contrast to content validity, concurrent and predictive validity can be measured statistically. Often assessing concurrent validity is the first step in estimating predictive validity.

A small study was undertaken in Yellowknife in one elementary school in 1981 as the first step in assessing the concurrent validity of SCOPE Mathematics. In the fall, pupils in grades 3, 4, 5, and 6 were given the Canadian Tests of Basic Skills (CTBS) and in the spring they were given SCOPE Mathematics. Pupils were ranked within each grade according to their CTBS Total Math scores. Then they were marked according to the number of skills mastered in SCOPE Mathematics. The two sets of ranks for each grade were then compared using Spearman's Rho Correlation. The results of this analysis (see Table 1) show a moderate to strong relationship between the two sets of scores with coefficients varying from .60 to .84. These results are promising as there were several aspects of this study that served to limit the size of the correlations that could be observed. (1) Tests given several months apart; (2) small sample size; (3) restricted range in the number of skills mastered; (4) poor standardization of procedure; (5) Spearman's Rho reduces the effects of differences at the extreme ends of the distributions. Thus, these results are taken as evidence of the concurrent validity of SCOPE Mathematics. Further validity studies are planned for 1981 and 1982.

Table 1

Rank Order correlation Coeficients for CTBS Total Math Scores and number of skills mastered on SCOPE Mathematics.

GRADE	N	r
3	17	.60
4	21	.79
5	21	.62
6	22	.84

Reliability — General Considerations

Reliability, like validity, is one of the critical dimensions on which tests are evaluated. Reliability generally refers to the stability of a given score or measurement, or the consistency with which an observation or measurement is made. As with validity however, reliability, and the method of determining it, is a function of the type of test under consideration and its intended use. One general statement can be made regarding all reliability measures however, and that is that the longer the test, i.e. the greater the number of questions it contains, the more reliable a measure it is likely to be.

Reliability of Criterion-Referenced Tests/SCOPE

The determination of reliability of criterion-referenced tests poses something of a problem in that the methods which are applicable to norm-referenced tests are not readily adapted to criterion-referenced tests. (A detailed discussion of this issue cannot be presented here.) Bearing in mind that tests such as SCOPE are concerned with judging whether or not a student has achieved mastery of the skills tested, one approach to the determination of the reliability of this judgement (given an accepted criterion of mastery, e.g. 80% correct) might be the re-testing of the same student to determine whether or not similar results are obtained on the test on both occasions. The time interval would have to be selected carefully to minimize the effect of memory, and in addition, care would have to be taken to ensure that instruction in the particular objectives measured had not been undertaken. The use of a parallel form of the test could also be considered.

No formal studies of the reliability of SCOPE have yet been undertaken although careful consideration has been given to the issue as reflected in the provision of a reasonable number of items for testing each skill. A study of the literature on criterion-referenced testing suggests that the seven items used in the majority of cases would provide acceptable reliability for the context in which SCOPE will be used. Reliability studies will be undertaken during the 1981/82 school year.

Appendix A

Skills Tested in SCOPE

Grade K-1

Number	Skill	Questions
K 5.1a	Matches equivalent sets.	1 - 7
K 5.1b	Builds appropriate sets.	8 - 14
K 5.2	Reproduces a given pattern.	15 - 21
K 10.1	Selects and/or makes an object that is bigger than or smaller than a given object.	22 - 26
1.1a	Counts number of objects in a set of 10.	27 - 33
1.1b	Uses ordinals to 5th.	34 - 39
1.3	Forms the numerals.	40 - 46
1.5	Finds the number before or after a given number from 0 to 10 Finds a number between two given numbers from 0 to 10.	47 - 53
2.1a	States basic facts involving sums (and minuends) to 9.	54 - 60
2.1b	States basic facts involving (sums and) minuends to 9.	61 - 67
6.1	Identifies (and names) 1¢, 5¢, 10¢, 25¢ coins.	68 - 74
10.1	(Estimates and) measures using (non standard) and standard units (Limit: metre and centimetre).	75 - 81
10.2	Recognizes and names triangle, rectangle, square.	82 - 84
11.2	Recognizes square, circle, triangle.	
10.7	Tells time to the hour.	85 - 91

Grade 2

Number	Skill	Questions
1.1a	Counts number of objects in a set to 100.	1 - 7
1.1b	Uses ordinals to 31st.	8 - 14
1.3a	Forms the numerals correctly.	15 - 21
1.3b	Writes number words to ten.	22 - 28
1.4	Identifies and names the number of 10's and the number of 1's in a two digit numeral.	29 - 35
1.5	Finds the number before or after a given number from 0 to 100. Finds a number between two given numbers from 0 to 100.	36 - 42
2.1a	States basic facts involving sums (and minuends) to 19.	43 - 49
2.1b	States basic facts involving (sums and) minuends to 19.	50 - 56
2.1c	Adds (and subtracts) 2 digit numbers without regroup – ing	57 - 63
2.1d	(Adds and) subtracts 2 digit numbers without regrouping	64 - 70
2.2	Demonstrates mastery of basic facts to 20. (Multiplication)	71 - 77
2.3	Demonstrates mastery of basic facts to 20. (Division)	78 - 84
3.3	Reads and writes Roman numerals to XX.	85 - 91
4.1a	Understands commutative property for addition (and multiplication.)	92 - 98
4.1b	Understands commutative property for (addition and) multiplication.	99 - 105
4.2	Understands associative property for addition.	106 - 112
4.3	Demonstrates the property of zero in addition and subtraction.	113 - 119
6.1a	Counts collections of coins to $1.00.	120 - 126
6.1b	Makes purchases and gives change up to $1.00.	127 - 133
7.1	Identifies fraction ½, ⅓, ¼ in a concrete setting.	134 - 140
9.1	Constructs simple bar graphs.	141 - 144
10.6	Reads and interprets Celsius thermometer.	145 - 151
10.7a	Tells time to the quarter hour.	152 - 158
10.7b	Reads dates on calendars.	159 - 165

Grade 3 and 3S

Number	Skill	Questions
1.2	Skip counts by (2's to 100), by 3's to 30, by 4's to 40, by 5's to 100, (by 10's to 100.)	1 - 7
1.3	Writes number words to twenty.	8 - 14
1.4	Identifies and names the number of 100's, 10's and 1's in a 3 digit numeral.	15 - 21
1.5	Reads and writes numerals in sequence from 0 to 1000.	22 - 28
2.1a	Adds (and subtracts) 2 digit numbers with regrouping.	29 - 35
2.1b	(adds and) subtracts 2 digit numbers with regrouping.	36 - 42
2.1c	Adds (and subtracts) 3 digit numbers without regrouping.	43 - 49
2.1d	(Adds and) subtracts 3 digit numbers without regrouping.	50 - 56
2.1e	Adds and subtracts multiples of 10 and 100.	57 - 63
2.2a	Demonstrates mastery of basic facts to 40. (Multiplication)	64 - 70
2.2b	Multiplies by multiples of 10 and 100.	71 - 77
2.2c	Multiplies, with regrouping, up to a 2 digit factor by a one digit factor.	78 - 84
2.2d	Estimates products by rounding off.	85 - 91
2.3	Introduces symbol ÷. Demonstrates mastery of basic facts to 40. [Division]	92 - 98
3.1	Rounds off numbers to nearest 10 and 100.	99 - 105
4.2	Understands associative property for multiplication.	106 - 112
4.3	Understands the property of zero in multiplication.	113 - 119
5.2	Recognizes the pattern of odd and even numbers.	120 - 126
6.1a	Counts money to $5.00.	127 - 133
6.1b	Makes purchases and gives change to $5.00.	134 - 140
7.1	Identifies and writes fractions, 1/2, 1/3, 1/4, 2/4, 3/4, 1/10, 1/100 as a representation of part of a whole or a group.	141 - 147
9.1	Collects data, constructs and interprets bar graphs.	148 - 154
10.2	Estimates and measures area using non standard and standard units (Limit: cm^2, m^2), without using formulae.	155 - 161
10.6	Distinguishes between degrees above and below zero.	162 - 168
10.7	Tells time to the nearest five minutes. Uses noon, midnight, a.m., p.m.	169 - 175
11.2a	Constructs 2-D shapes.	176 - 178
11.2b	Recognizes regular polygons.	179 - 183

Grade 4

Number	Skill	Questions
1.3	Writes number words to one hundred.	1 - 7
1.4	Gives the place value of any digit in a 4 digit numeral (and uses this to write in expanded form.)	8 - 14
1.5a	Finds a numeral between two given numerals from 0 to 10 000.	15 - 21
1.5b	Uses appropriate symbols; $<, =, >, (\neq)$.	22 - 28
2.1a	Adds (and subtracts) four digit numbers with regrouping.	29 - 35
2.1b	(Adds and) subtracts four digit numbers with regrouping.	36 - 42
2.2a	Demonstrates mastery of all basic facts.(Multiplication)	43 - 49
2.2b	Multiplies by multiples of (10,100 and) 1000.	50 - 56
2.2c	Multiplies, with regrouping, up to a 4 digit factor by a 2 digit factor.	57 - 63
2.3a	Demonstrates mastery of all basic facts.(Division)	64 - 70
2.3b	Divides, with remainder, up to a 3 digit dividend by a one digit divisor.	71 - 77
2.3c	Divides multiples of 10 by 10.	78 - 84
3.1	Rounds off to any of five digits in a 6 digit number.	85 - 91
3.3	Reads, writes and translates Roman numerals I,V,X,L,C, D,M.	92 - 98
4.5	Applies distributive property to multiplication.	99 - 105
6.1	(Counts), adds, subtracts, multiplies money.	106 - 112
6.2	Reads and writes decimals to hundredths.	113 - 119
6.3a	Adds (and subtracts) decimals to hundredths with regrouping.	120 - 126
6.3b	(Adds and) subtracts decimals to hundreths with regrouping.	127 - 133
6.4	Multiplies decimals to hundredths by single digit whole numbers with regrouping.	134 - 140
7.1	Relates 1/10's and 1/100's to decimals.	141 - 147
9.1a	Collects data, (constructs) and interprets bar graphs, pictographs, and line graphs by using one-to-one scale and one-to-many scale.	148 - 154
9.1b	Constructs pictographs and line graphs.	155 - 156
10.3	Estimates and measures using standard (and non standard) units (cm^3).	157 - 163
10.6	Knows the significance of 0°C and 100°C.	164 - 165

10.7	Tells time to the minute.	166 - 172
11.1	Recognizes cube, cone, sphere, cylinder, pyramid, rectangular prism, triangular prism.	173 - 177
11.2a	Locates, without definition, angles, parallel lines, line segments, right angles.	178 - 184
11.2b	Recognizes congruent plane shapes.	185 - 191

Grade 5

Number	Skill	Questions
1.3	Writes number words.	1 - 7
1.4	Gives the value of any digit in a 6 digit number and uses this to write in expanded form.	1 - 7
1.5	Reads and writes numerals in sequence from 0.001 to 100 000.	8 - 14
2.1	Adds and subtracts any whole numbers.	15 - 21
2.2	Multiplies up to 4 digits by 3 digits.	16 - 28
2.3	Divides, with remainder, up to a 6 digit dividend by a 2 digit divisor.	29 - 35
2.3b	Divides multiples of 100 by 100.	36 - 42
3.1	Rounds off decimals to wholes, tenths and hundredths.	43 - 49
3.2	Uses correct order of operation in a 2 step problem.	50 - 56
3.3	Reads and translates Roman numerals to MCMLXXX.	57 - 63
4.5	Applies the distributive property to division.	64 - 70
5.2a	Identifies numbers as prime or composite.	71 - 77
5.2b	Performs prime factorization on numbers to 64.	78
5.4	Introduces use of arithmetic mean.	79 - 84
6.1	Divides money.	
6.2a	Reads and writes decimals to thousandths.	
6.2b	Expands decimal numerals using expanded notation to 2 decimal places.	
6.3a	Adds (and subtracts) decimals.	
6.3b	(Adds and) subtracts decimals.	
6.4a	Multiplies decimals (to thousandths) by whole numbers and by decimals (to tenths).	
6.4b	Multiplies decimals by powers of ten.	
7.2	Divides decimals (to hundredths) by single digit whole numbers.	
7.2	Understands and uses the terms: proper fractions, mixed numerals, numerator, denominator.	
9.2a	Uses ordered pairs to construct graphs.	
9.2b	Generates ordered pairs (positive quadrant only).	
10.1a	Adds and subtracts units.	
10.1b	Converts units by multiplying and dividing by powers of 10.	
10.1c	Measures or calculates perimeters of regular polygons.	

10.2	Finds areas of regular polygons by counting squares.	
11.2	Distinguishes between right and non-right triangles.	
11.3	Identifies a motion as a slide, flip or turn.	
10.7a	Computes time differences.	20
10.7b	Converts days to hours, hours to minutes, minutes to seconds.	208 - 214

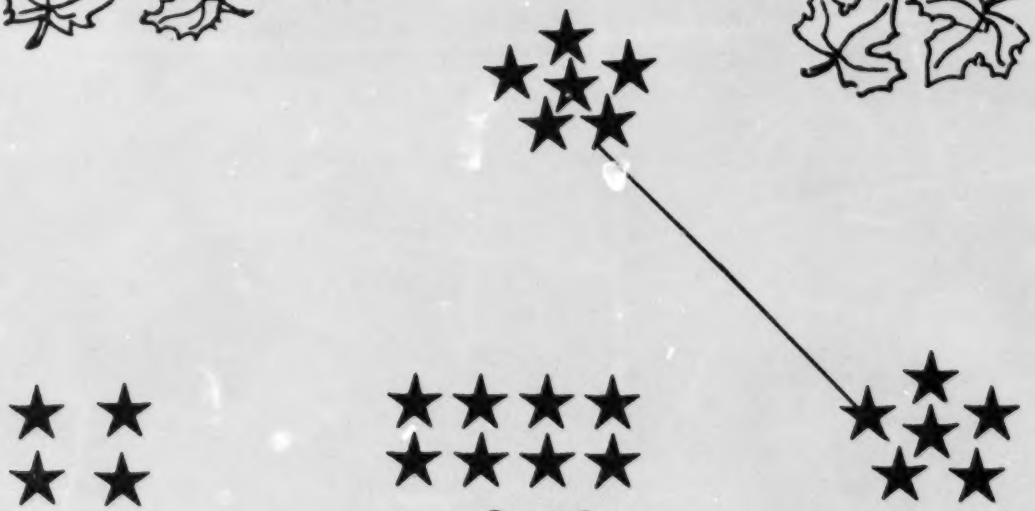
31

Grade 6

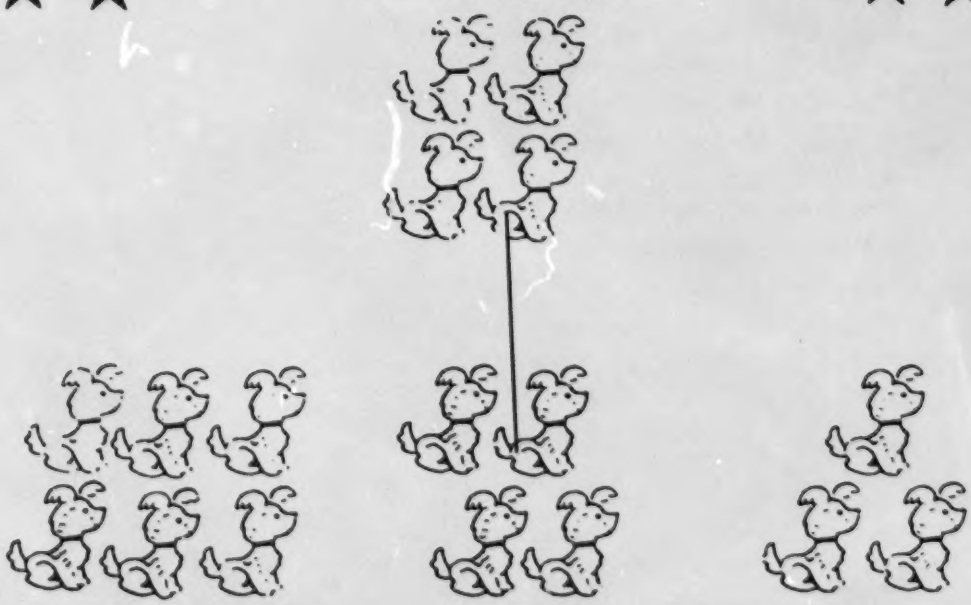
Number	Skill	Questions
2.3	Divides, with remainder, up to a 6 digit dividend by a 3 digit divisor. Expresses remainders in decimal forms.	1 - 7
3.2	Uses correct order of operation in 3 step problems.	8 - 14
5.3a	Applies exponential notation as a shorthand when factoring (and writing expanded notation).	15 - 21
5.3b	(Applies exponential notation as a shorthand when factoring and) writing expanded notation.	22 - 28
5.4	Makes practical applications of arithmetic mean.	29 - 35
6.5	Divides decimals (to thousandths) by whole numbers, and by decimals to tenths.	36 - 42
6.6	Evaluates fractions in decimal form to stated number of decimal places.	43 - 49
7.2	Understands (and uses) the term(s) improper fractions, (equivalent fractions).	50 - 56
7.3	(Identifies equivalence) generates equivalent fractions for halves, tenths, hundredths.	57 - 63
7.4	Adds and subtracts fractions with common denominators.	64 - 70
8.1	Identifies percent as a two place decimal and as a fraction with the denominator of 100.	71 - 77
8.2a	Interprets simple ratio situation.	78 - 84
8.2b	(Expresses and) generates proportional ratios.	85 - 91
9.2	Uses ordered pairs in all four quadrants.	92 - 98
10.1	(Uses simple ratio to) produce and read scale drawings.	99 - 105
10.2	(Discovers and) uses formulae for triangles and regular quadrilaterals.	106 - 112
10.3	(Discovers and) uses formula for rectangular solids.	113 - 119
11.2a	Identifies triangles as equilateral, isosceles or scalene.	120 - 126
11.2b	Identifies parts of a circle.	127 - 132
12.1a	Substitutes in, and evaluates, simple formulae.	133 - 139
12.1b	Solves simple equations of the form: $4 \times a = 12$.	140 - 146
12.3	Identifies and orders integers.	147 - 153

1.

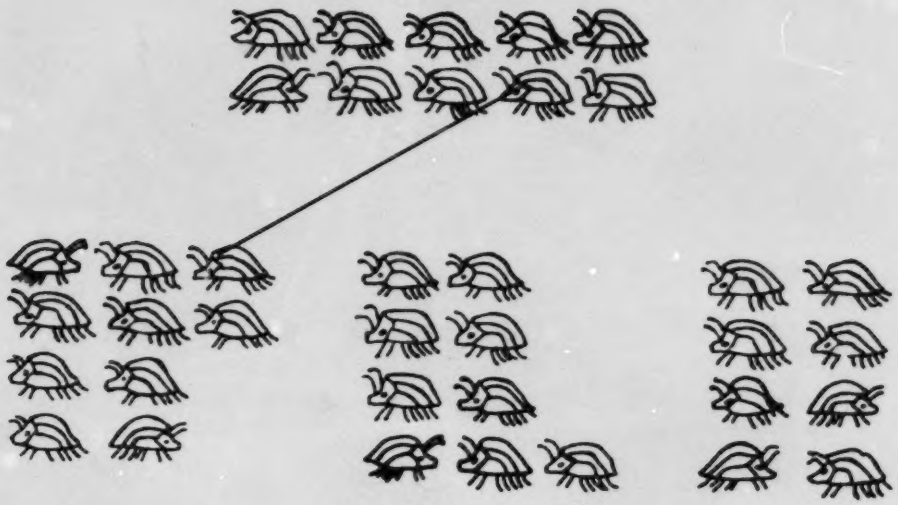
2.



3.



4.



5.

6.

7.

8. ○ ○

9. ○ ○ ○ ○ ○

10. ○ ○ ○ ○ ○ ○ ○ ○ ○

11. ○ ○ ○ ○

12. ○ ○ ○ ○ ○ ○

13. ○ ○ ○ ○ ○ ○ ○ ○

14. ○ ○ ○

15. ○ □ ○

16. ○ □ □ ○

17. ○ △ ○ ○ □

18. △ △ □ □ ○

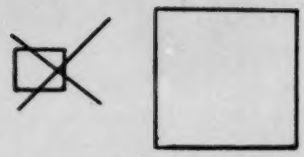
19. ○ ○ □ △ △ ○

20. □ ○ △ △ ○ ○ □

21. ○ △ ○ □ □

35

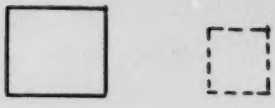
22.



23.

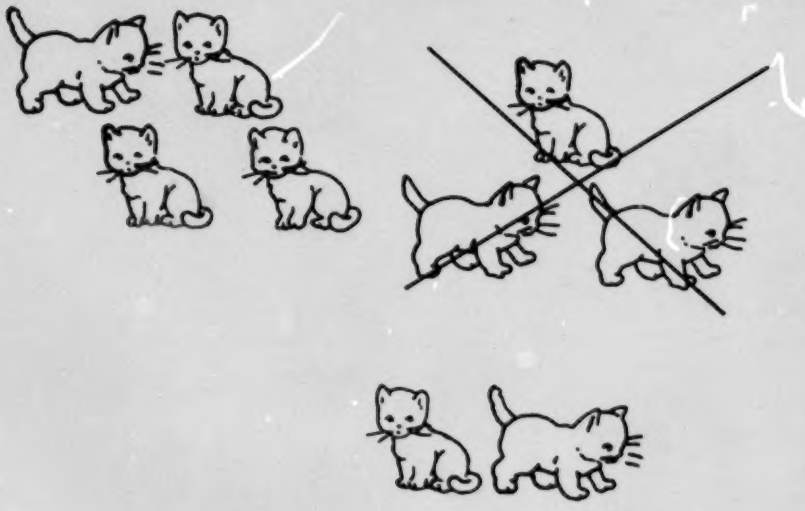
24.

25.

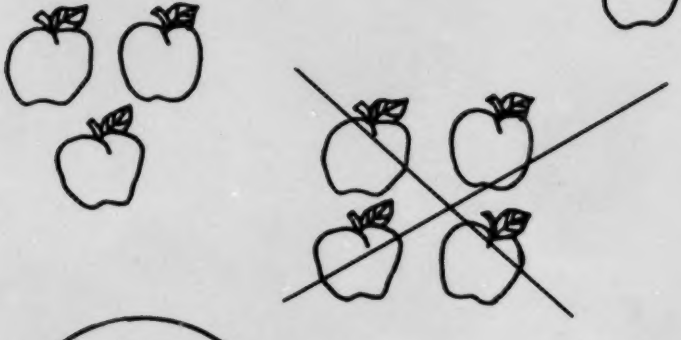


26.

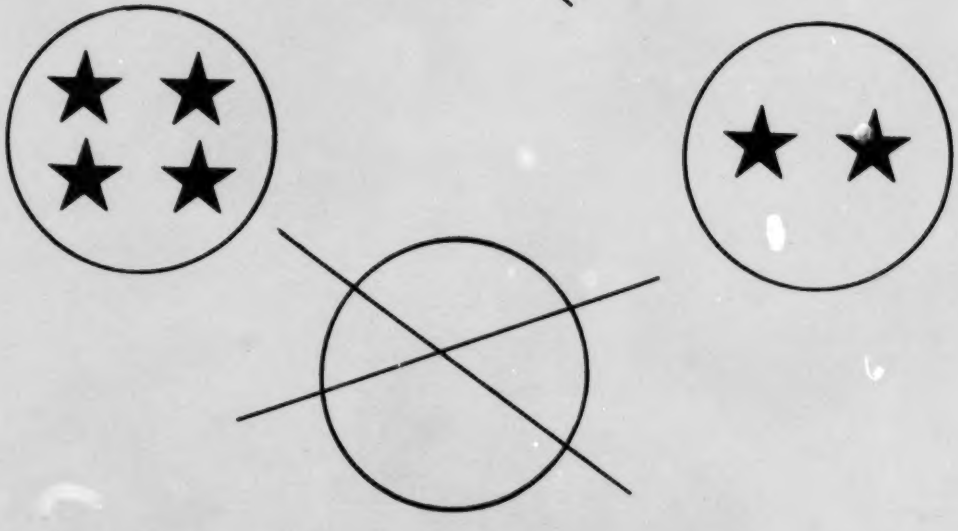
27.



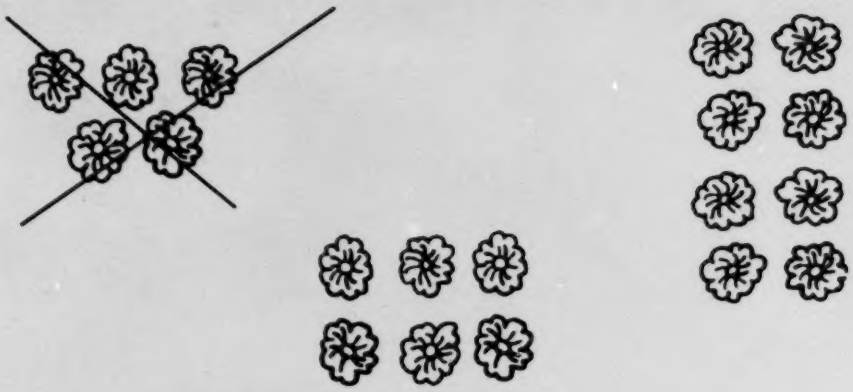
28.



29.

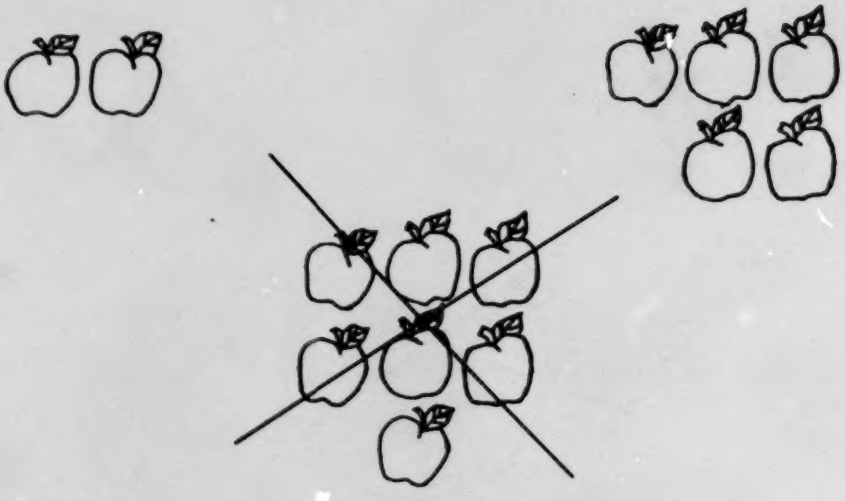


30.

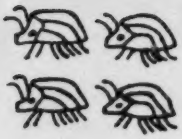


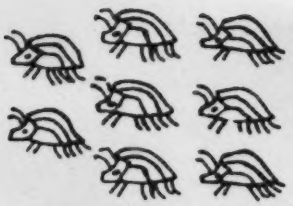
31.

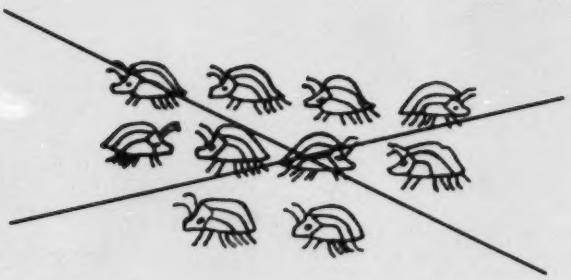
32.



33.







34.

35.

36.

37.

38.

39.

38

40. 5
41. 8
42. 2
43. 9
44. 3
45. 7
46. 6

47. 3 4 6
48. 2 4 6
49. 5 7 9
50. 6 8 9
51. 0 2 4
52. 2 4 5
53. 6 8 10

54. 3
55. 4
56. 7
57. 9
58. 5
59. 8
60. 6

61. 4
62. 3
63. 6
64. 2
65. 3
66. 4
67. 2

68.

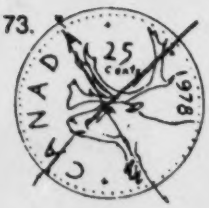
69.

70.

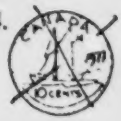
39

BEST COPY AVAILABLE

71.

73. 

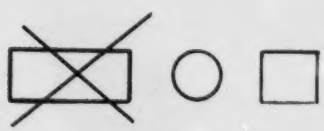
72.

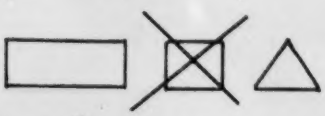
74. 

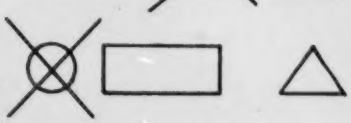
90.

91.

75. 10 cm
76. 8 cm
77. 3 cm
78. 13 cm
79. 2 cm
80. 6 cm
81. 6 cm

82. 

83. 

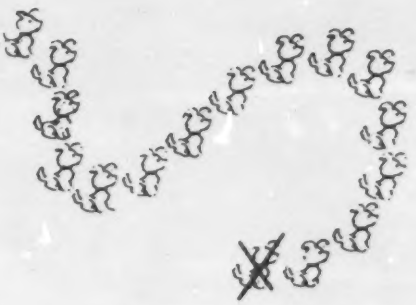
84. 

85. 3 o'clock
86. 2 o'clock
87. 8 o'clock
88. 4 o'clock
89. 11 o'clock

BEST COPY AVAILABLE

1. 16 (18) 20
2. 10 (20) 30
3. 14 15 16 (17)
4. (16) 17 18 19
5. 10 12 20 (22)
6. 33 34 (35) 36
7. 39 (42) 43 45

11.

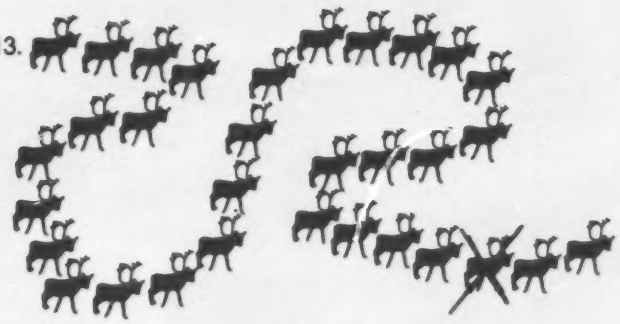


8.

12.

9.

13.



10.

14.

15. 10
16. 27
17. 49
18. 68
19. 73
20. 94
21. 100

22. two
23. six
24. eight
25. three
26. five
27. nine
28. ten

29. 4
30. 1
31. 7
32. 5
33. 3
34. 6
35. 2

36. 71 73 75
37. 54 55 57
38. 13 15 17
39. 23 25 27
40. 33 34 38
41. 62 64 67
42. 92 93 95

43. 16
44. 18
45. 14
46. 17
47. 10
48. 13
49. 15

50. 11
51. 18
52. 2
53. 7
54. 9
55. 8
56. 10

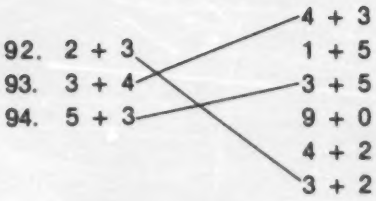
57. 98
58. 69
59. 56
60. 99
61. 74
62. 55
63. 47

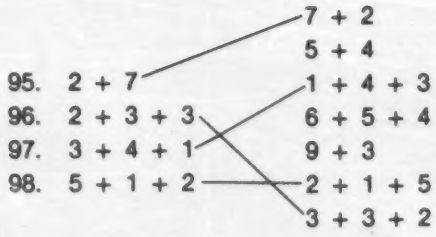
64. 12
65. 21
66. 15
67. 1
68. 77
69. 26
70. 19

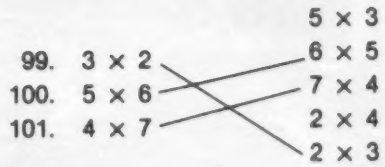
71. 6
72. 9
73. 10
74. 12
75. 16
76. 18
77. 20

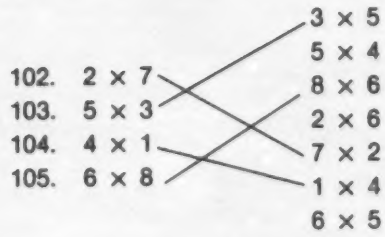
78. 2
79. 7
80. 3
81. 1
82. 5
83. 2
84. 4

85. II
86. IX
87. XIV
88. 4
89. 8
90. 12
91. 19









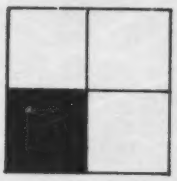
106. 6
107. 7
108. 9
109. 17
110. 14
111. 10
112. 8

113. 14
114. 19
115. 20
116. 9
117. 11
118. 15
119. 17

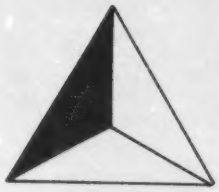
120. $0.15
121. $0.07
122. $0.16
123. $0.31
124. $0.32
125. $0.72
126. $0.95

127. 7¢
128. 12¢
129. 20¢
130. 24¢
131. 41¢
132. 23¢
133. 9¢

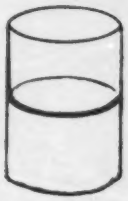
134.



135.



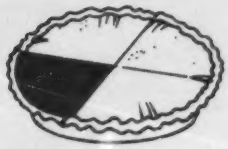
136.



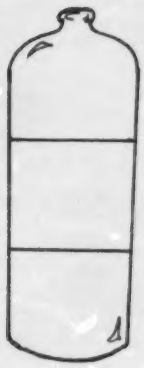
137.

138.

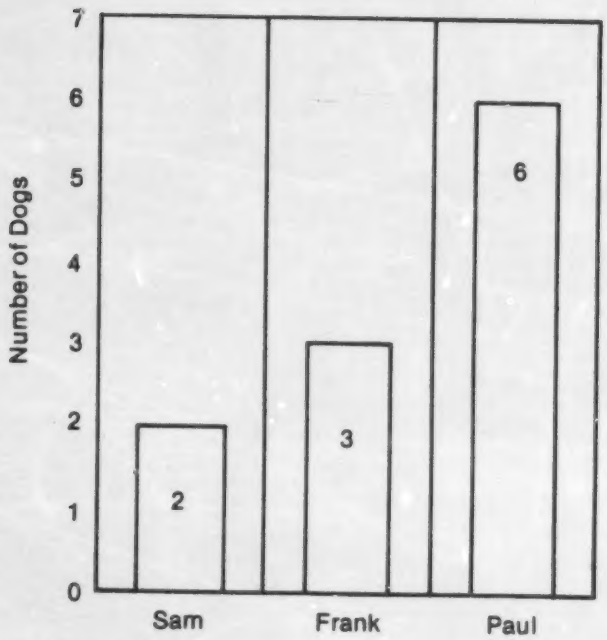
139.



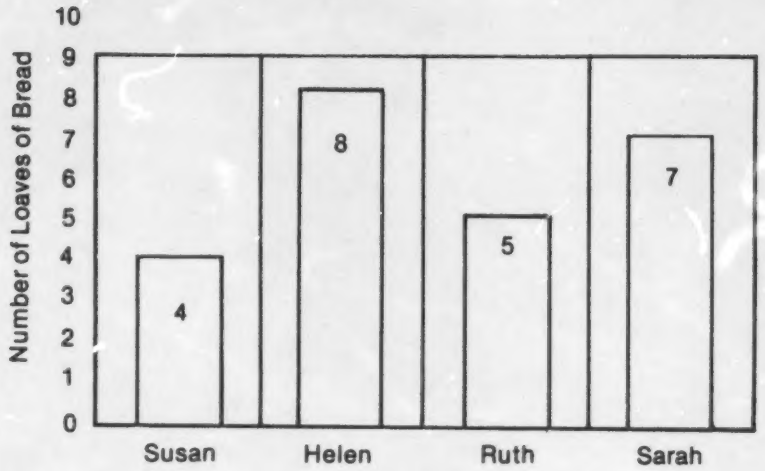
140.



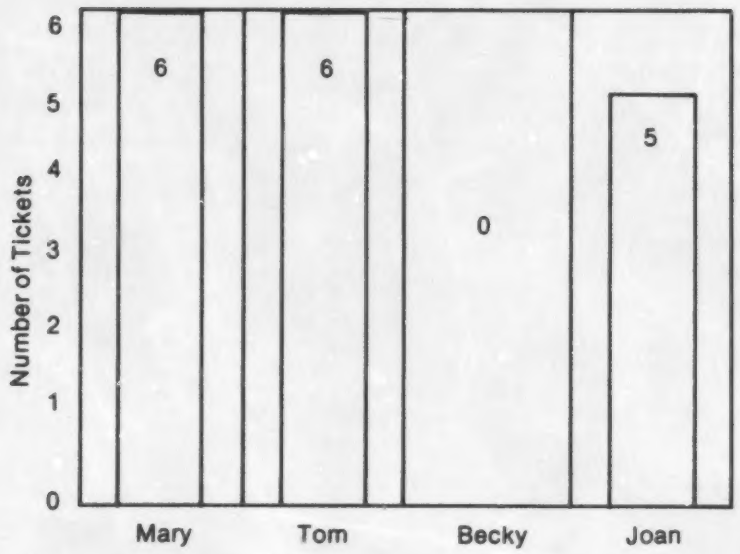
141.



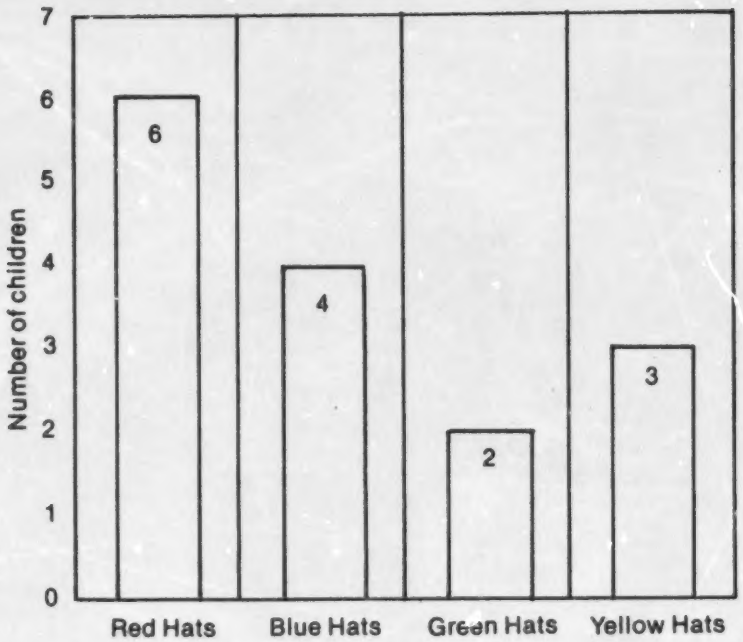
142.


Number of Loaves of Bread
10
9
8
7
6
5
4
3
2
1
0
4
8
5
7
Susan
Helen
Ruth
Sarah

143.

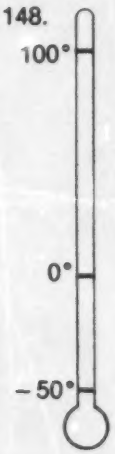

Number of Tickets
6
5
4
3
2
1
0
6
6
0
5
Mary
Tom
Becky
Joan

144.

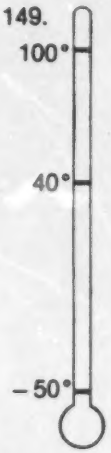


145. 80°C
146. 60°C
147. 30°C

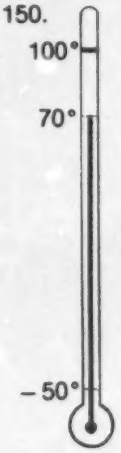
148.



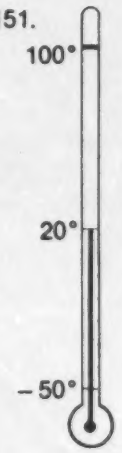
149.



150.



151.



152. 12:15
153. 4:45
154. 8:15

155.

156.

157.

158.

159.

April

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6	7	8	~~9~~	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

160.

July

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	~~28~~	29

161. Monday, May 17
162. Friday, August 25
163. Tuesday, June 11
164. Sunday, Sept. 16
165. Thursday, Jan. 31

Grade 3 (Scoring Key)

Question	Answer
1	44, 46, 48
2	12, 15, 18
3	60, 70, 80
4	40, 45, 50
5	32, 36, 40
6	20, 24, 28
7	24, 27, 30
8	eighteen
9	twenty
10	fourteen
11	nineteen
12	twelve
13	sixteen
14	eleven
15	4
16	6
17	5
18	3
19	6
20	9
21	0
22	197, 198
23	235, 237
24	999, 1 000
25	892, 894
26	800, 803
27	250, 252
28	499, 501
29	31
30	111
31	140
32	103
33	154
34	148
35	134
36	9
37	4
38	17
39	39
40	1
41	56
42	18
43	467
44	989
45	692
46	794
47	878
48	895
49	759
50	213
51	427
52	160
53	612
54	135
55	504
56	240
57	30
58	20
59	70
60	10
61	100
62	600
63	200
64	35
65	32
66	30
67	28
68	22
69	30
70	24
71	54
72	108
73	144
74	138
75	54
76	176
77	413

18

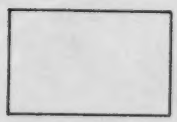
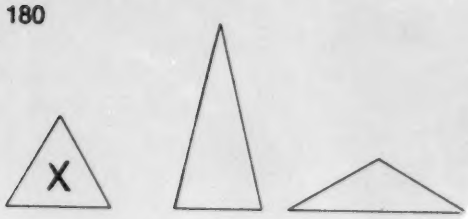
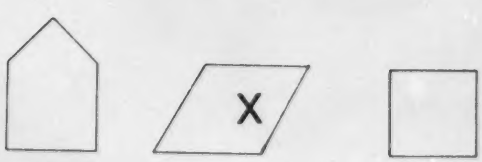
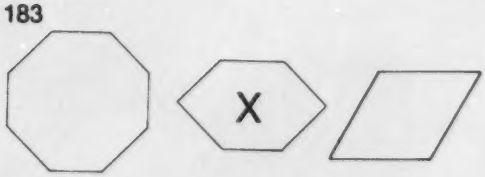
Question	Answer
78	80
79	400
80	600
81	3 000
82	7 200
83	560
84	5 000
85	70
86	100
87	190
88	110
89	80
90	30
91	190
92	4
93	12
94	9
95	7
96	3
97	2
98	5
99	320
100	870
101	940
102	3 600
103	34 900
104	49 900
105	10 100

106	$2 \times (5 \times 6)$	9×7
107	$(9 \times 1) \times 7$	$2 \times (8 \times 3)$
108	$(4 \times 3) \times 8$	14×4
109	$7 \times (2 \times 4)$	10×6
		$4 \times (3 \times 8)$
		$(4 \times 9) \times 5$

110	$(5 \times 1) \times 8$	$9 \times (2 \times 4)$
111	$(9 \times 3) \times 2$	9×6
112	$2 \times (4 \times 6)$	$7 \times (6 \times 4)$
		5×8
		$(2 \times 4) \times 6$

Question	Answer
113	0
114	0
115	5
116	0
117	19
118	6
119	0
120	24, 26, 28
121	13, 15, 17
122	34, 36, 38
123	23, 25, 27
124	47, 49, 51
125	16, 18, 20
126	31, 33, 35
127	\$3.42
128	\$3.60
129	\$2.55
130	\$3.76
131	\$4.21
132	\$3.05
133	\$2.87
134	\$1.31
135	\$1.74
136	\$0.17
137	\$2.90
138	\$0.33
139	\$1.04
140	\$0.88
141	$\frac{1}{3}$
142	$\frac{1}{4}$
143	$\frac{1}{3}$
144	$\frac{3}{4}$
145	$\frac{1}{10}$
146	$\frac{1}{100}$
147	$\frac{7}{100}$

Question	Answer
148	Jim
149	Peter
150	Anne
151	5
152	7
153	0
154	8
155	50 m²
156	8 cm²
157	8 cm²
158	9 cm²
159	18 m²
160	10 cm²
161	24 m²
162	– 19°C
163	12°C
164	– 3°C
165	8°C
166	– 14°C
167	– 2°C
168	5°C
169	9:20
170	6:50
171	4:05
172	6:25
173	7:35
174	noon
175	midnight
176	

Question	Answer
177	
178	
179	
180	
181	
182	
183	

Grade 4 (Scoring Key)

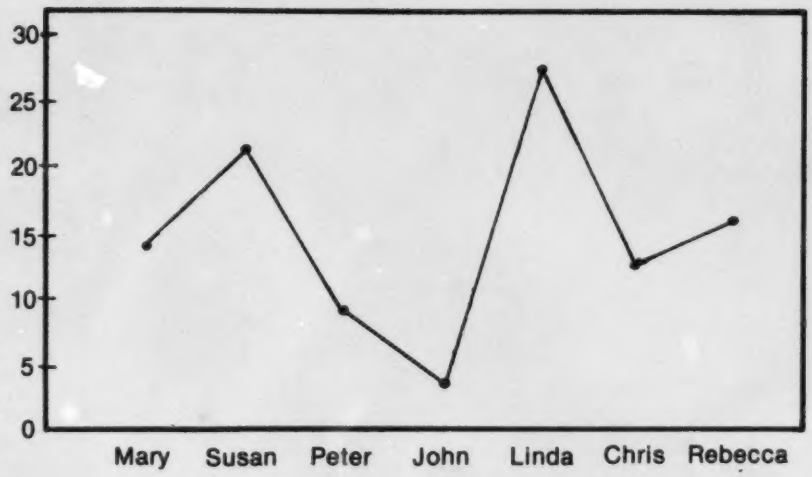
Question	Answer
1	twenty-five
2	thirty-six
3	forty-eight
4	fifty-one
5	seventy-nine
6	eighty-five
7	sixty-one
8	thousand
9	tens
10	ones
11	hundreds
12	tenths
13	thousandths
14	hundredths
15	1 000 1 002 1 004
16	1 110 1 111 1 113
17	2 320 2 322 2 324
18	7 634 7 636 7 637
19	5 604 5 606 5 608
20	9 660 9 662 9 663
21	9 996 9 998 10 000
22	>
23	>
24	=
25	<
26	>
27	=
28	>
29	4 719
30	10 919
31	12 041
32	18 603
33	152
34	271
35	742
36	2 189
37	3 908
38	7 913
39	1 955
40	400
41	5 181
42	2 018
43	54
44	88
45	84
46	56
47	70
48	121
49	144
50	63 000
51	16 000
52	18 000
53	60 000
54	296 000
55	60 000
56	138 000
57	1 452
58	57 960
59	171 850
60	95 018
61	196 780
62	81 445
63	59 436
64	4
65	3
66	5
67	9
68	12
69	9
70	11

Question	Answer
71	71 R1
72	51 R3
73	35 R5
74	69 R6
75	72 R0
76	77 R1
77	52 R4
78	12
79	23
80	78
81	64
82	342
83	564
84	838
85	346 220
86	868 300
87	419 250
88	692 800
89	721 000
90	270 000
91	900 000
92	50
93	100
94	500
95	1 000
96	LII
97	CL
98	DV
99	9
100	50
101	50
102	5
103	8
104	10
105	90

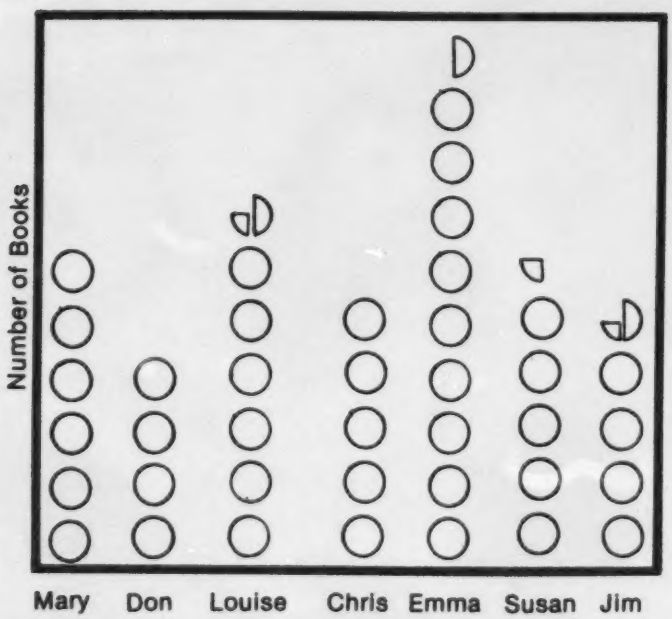
Question	Answer
106	$2.92
107	$5.64
108	$48.62
109	$7.37
110	$2.10
111	$8.94
112	$24.43
113	0.8
114	0.75
115	0.96
116	0.63
117	0.07
118	0.2[illegible]
119	0.34
120	1.01
121	1.86
122	3.21
123	0.98
124	2.32
125	0.73
126	1.02
127	0.23
128	1.48
129	0.25
130	2.09
131	0.94
132	0.29
133	1.88
134	13.02
135	31.41
136	47.74
137	63.84
138	56.16
139	83.43
140	50.10

Question	Answer
141	95/100
142	8/10
143	75/100
144	0.69
145	0.07
146	0.93
147	0.5
148	December
149	October
150	November
151	60
152	25
153	September
154	January

156

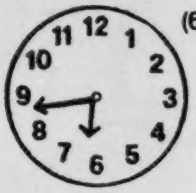


155



Question	Answer
157	3 cm³
158	12 cm³
159	8 cm³
160	16 cm³
161	4 cm³
162	24 cm³
163	20 cm³
164	freezing point freeze
165	boiling point boil
166	10:12
167	8:36
168	11:23
169	7:56

Question **Answer**

170  (6:43)

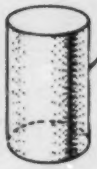
171 (1:27)

172 (3:28)

173

174

175

176 

177

triangle

cylinder

rectangle

pyramid

sphere

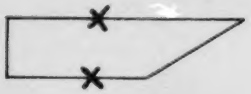
circle

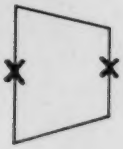
rectangular prism

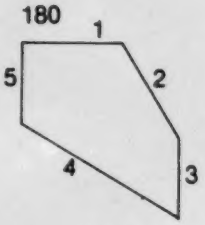
cone

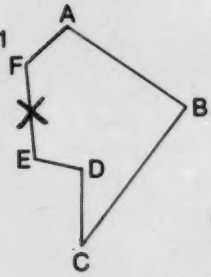
square

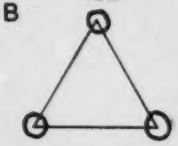
Question **Answer**

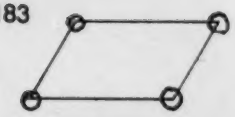
178 

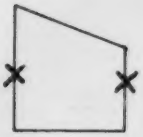
179 

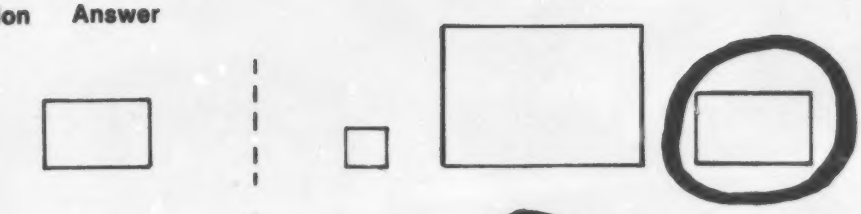
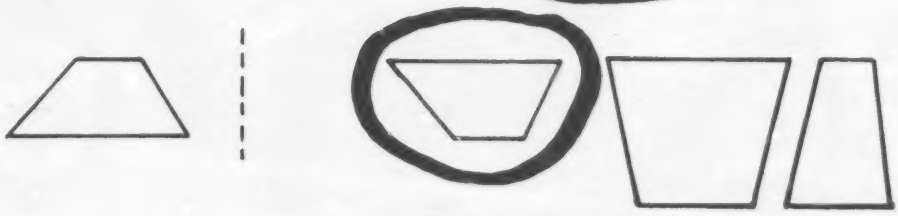
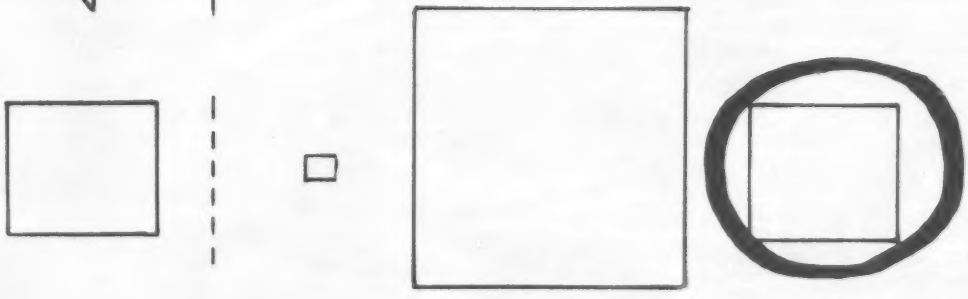
180 

181 

182 

183 

184 

Question	Answer
185	
186	
187	
188	
189	
190	
191	

Grade 5 (Scoring Key)

Question	Answer	Question	Answer
1	three hundred and sixty-four	36	432 R2
2	five hundred and eight	37	5 869 R3
3	one hundred and nineteen	38	744 R8
4	two hundred and seventy-nine	39	3 635 R1
5	eight hundred and three	40	919 R20
6	nine hundred and ninety-nine	41	810 R15
7	one thousand	42	2 405 R4
8	tenths	43	1
9	tenths	44	9
10	thousandths	45	17
11	hundredths	46	34
12	hundreds	47	89
13	tenths	48	60
14	thousands	49	990
15	166 168 169	50	12
16	179.1 179.3 179.5	51	0.9
17	498 500 502	52	2.2
18	701.02 701.03 701.05	53	18.9
19	37 807 37 809 37 810	54	5.06
20	2.871 2.872 2.874	55	15.31
21	1 997 1 999 2 001	56	21.30
22	649	57	A
23	2 580	58	C
24	2 362	59	B
25	111	60	D
26	7 461	61	C
27	7 234	62	A
28	1 172	63	C
29	35 916	64	35
30	38 493	65	60
31	272 986	66	150
32	284 441	67	1 980
33	161 250	68	XLIX
34	458 724	69	LXXXII
35	838 452	70	CX

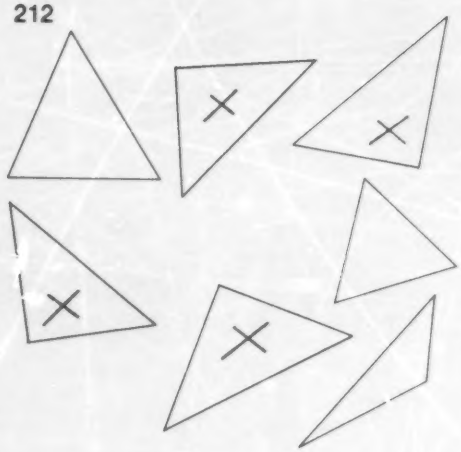
Question	Answer
71	8
72	200
73	300
74	800
75	60
76	210
77	900
78-84	5 7 11 13 17 19 23
85	3×3
86	5×7
87	$2 \times 2 \times 2$
88	$2 \times 3 \times 7$
89	$2 \times 2 \times 3 \times 3$
90	$2 \times 2 \times 5$
91	$3 \times 3 \times 3 \times 3$
92	7
93	3
94	5
95	12
96	18
97	4
98	5
99	$0.24
100	$0.35
101	$2.15
102	$2.07
103	$2.03
104	$3.04
105	$50.10
106	0.862
107	0.153
108	0.705
109	2
110	2
111	0
112	0

Question	Answer
113	$\frac{6}{10}$
114	$\frac{8}{100}$
115	$\frac{9}{100}$
116	$\frac{2}{10}$
117	$\frac{7}{100}$
118	$\frac{1}{10}$
119	$\frac{3}{100}$
120	3.318
121	10.938
122	53.156
123	7.07
124	32.97
125	353.09
126	43.79
127	0.123
128	1.208
129	0.414
130	0.456
131	0.939
132	2.461
133	2.79
134	0.25
135	14.674
136	450.252
137	18.651 7
138	3.315 2
139	15.978
140	2.502 9
141	69.2
142	1 538
143	26.375
144	30 587.5
145	90 160
146	1 005
147	5

Question	Answer
148	0.12
149	0.24
150	0.05
151	6.5
152	21.98
153	20.52
154	45.22
155	$\frac{7}{8}$
156	$8\frac{1}{8}$
157	$\frac{7}{9}$
158	$1\frac{1}{2}$ $\frac{6}{8}$ $\frac{4}{9}$
159	$5\frac{3}{4}$ $\frac{3}{7}$ $\frac{5}{8}$
160	$\frac{8}{9}$ $6\frac{1}{8}$ $\frac{9}{12}$
161	$\frac{3}{5}$ $\frac{7}{10}$ $3\frac{8}{12}$
162	diamond or star
163	A (5, 5)
164	B (5, 8)
165	C (8, 1)
166	D (5, 2)
167	E (2, 1)
168	F (4, 7)
169	G (6, 4)
170	0.80 m
171	76.25 m
172	0.09 m
173	2.08 cm
174	250 g
175	791.5 g
176	46.75 mL
177	200 cm
178	5 000 cm
179	0.5 m
180	1.8 m
181	54 000 cm
182	83 cm
183	10.00 m

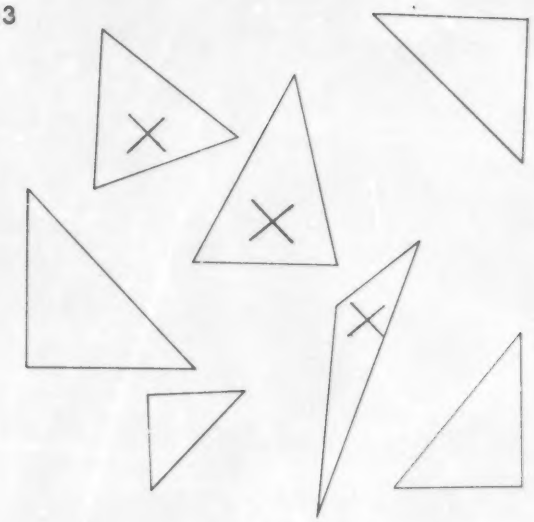
Question	Answer
184	8 m
185	16 m
186	9 cm
187	8 m
188	18 cm
189	26 m
190	28 m
191	8 cm^2
192	8 cm^2
193	50 cm^2
194	9 cm^2
195	18 cm^2
196	24 cm^2
197	10 cm^2
198	16:15
199	07:38
200	00:36
201	09:45
202	13:58
203	20:49
204	21:20
205	48 h
206	84 h
207	420 min.
208	195 min.
209	345 min.
210	450 s
211	615 s

212



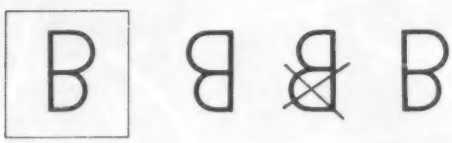
Question **Answer**

213

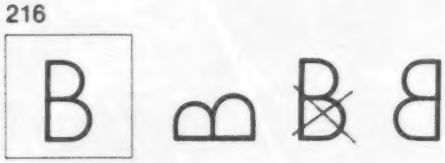


214

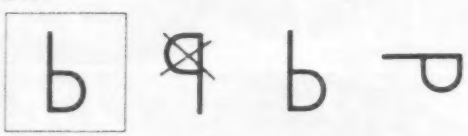
215



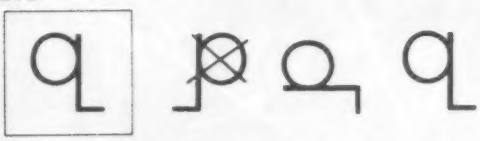
216



217

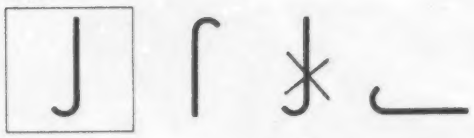


218



Question **Answer**

219



220

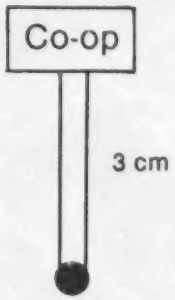
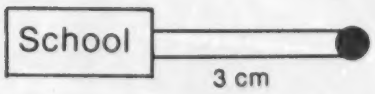
59

Grade 6 (Scoring Key)

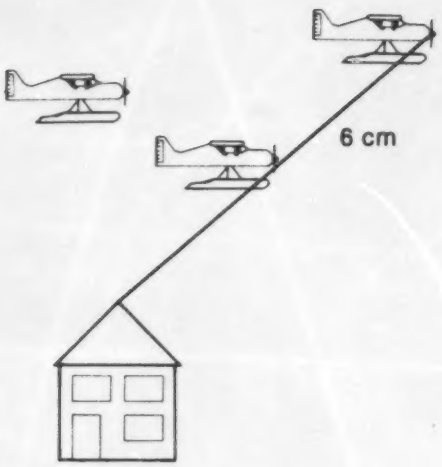
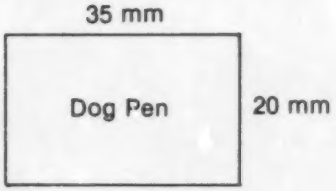
Question	Answer
1	3.20
2	3.00
3	4.44
4	17.42
5	44.08
6	51.57
7	3 113.15
8	B
9	C
10	A
11	B
12	C
13	A
14	A
15	3×2^4
16	5×5^2
17	2×8^3
18	2×3^3
19	3×4^4
20	2×5^4
21	4×7^2
22	$(2 \times 10^3) + (3 \times 10^2) + (4 \times 10) + (8 \times 1)$
23	$(4 \times 10^3) + (5 \times 10^2) + (2 \times 10) + (1 \times 1)$
24	$(9 \times 10^3) + (5 \times 10^2) + (0 \times 10) + (0 \times 1)$
25	$(7 \times 10^4) + (9 \times 10^3) + (8 \times 10^2) + (4 \times 10) + (3 \times 1)$
26	$(1 \times 10^4) + (0 \times 10^3) + (4 \times 10^2) + (9 \times 10) + (0 \times 1)$
27	$(4 \times 10^4) + (2 \times 10^3) + (7 \times 10^2) + (6 \times 10) + (1 \times 1)$
28	$(9 \times 10^4) + (9 \times 10^3) + (8 \times 10^2) + (7 \times 10) + (2 \times 1)$
29	22
30	$120
31	4
32	19
33	20
34	$7
35	$1.07

Question	Answer
36	0.151
37	0.042
38	1.16
39	0.18
40	0.254 9
41	0.645 78
42	0.789 32
43	0.25
44	0.20
45	0.60
46	0.14
47	0.667
48	0.125
49	0.167
50	9/7
51	39/8
52	7/2
53	10/9
54	numerator 3 or less
55	numerator 5 or less
56	numerator 6 or less

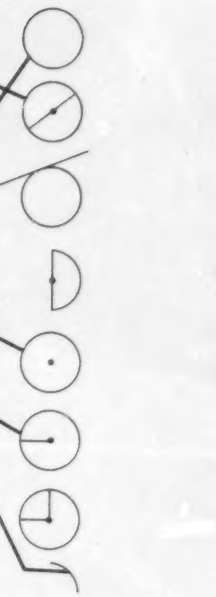
Question	Answer
57	2/10
58	25/100
59	2/5
60	3/5
61	1/2
62	3/4
63	7/10
64	8/9
65	6/7
66	4/5
67	1/4
68	5/9
69	3/6
70	1/3
71	25/100
72	75/100
73	20/100
74	15/100
75	0.63
76	0.38
77	1.00
78	2 m
79	8 blue books
80	25 boys
81	144 km
82	6 teachers
83	1.6 m
84	900 m
85	8:6 or 4:3
86	6:4 or 3:2
87	20:3
88	4:3
89	20:4 or 5:1
90	2:4 or 1:2
91	15:10 or 3:2

Question	Answer
96	(0,4)
97	(−3,1)
98	(0, −4)
99	2 km
100	3.5 km
101	7.5 km
102	
103	

61

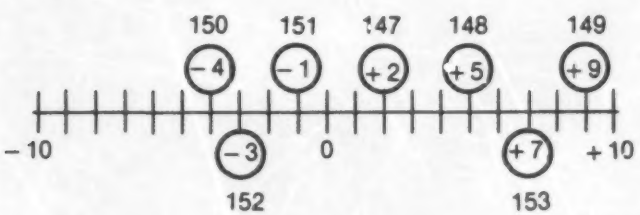
Question	Answer
104	
105	
106	6 cm²
107	96 cm²
108	45 cm²
109	180 cm²
110	252 cm²
111	375 cm²
112	289 cm²
113	72 cm³
114	64 cm³
115	64 cm³
116	16 cm³
117	32 cm³
118	64 cm³
119	40 cm³
120	E
121	S
122	I
123	S
124	E
125	I
126	S

Question	Answer
127	Diameter
128	Arc
129	Circumference
130	Centre
131	Radius
132	Quadrant



133	7
134	6
135	3
136	4
137	7
138	2
139	9
140	4
141	3
142	11
143	4
144	6
145	12
146	3

147-153



PROGRAMS AND EVALUATION BRANCH
DEPARTMENT OF EDUCATION
NORTHWEST TERRITORIES

Developed by I. R. Brooks, Ph. D., CIBER Ltd.